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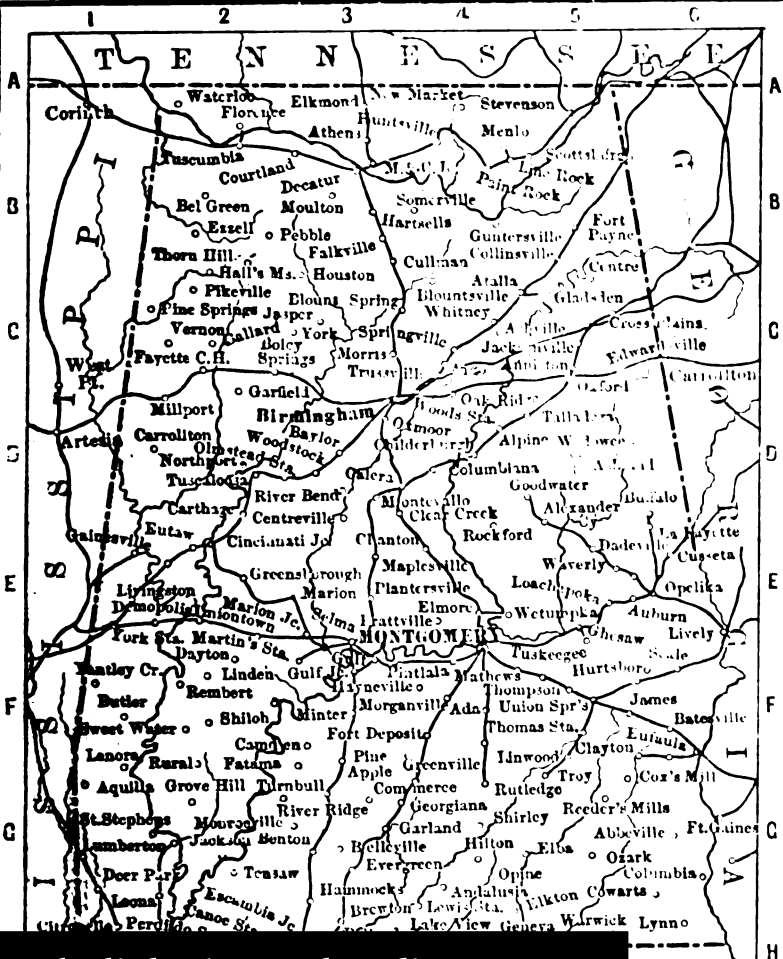
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and treasury of ready reference*

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• **Treasury of Ready Reference** •

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BY K. L. ARMSTRONG.

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You will be unwilling,  
For many a shilling,  
To part with the profit  
Which you shall have of it.”  
—*The Key to Unknown Knowledge.*

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*"The era is fast approaching when no writer will be read by the majority except those who can effect for bales of manuscript what the hydrostatic screw performs for bales of cotton—condense into a period what before occupied a page."—Cotter.*

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*Francis H. Appeltauer*



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*This rule to all when I am dead:  
Be sure you're right, then go ahead.*  
—DAVY CROCKETT.



## GEMS OF KNOWLEDGE.

### Handy Facts to Settle Many Arguments.

London plague in 1665.

Telephone invented, 1861.

There are 2,750 languages.

Two persons die every second.

Sound moves 743 miles per hour.

Chinese invented paper, 170 B.C.

A square mile contains 640 acres.

A barrel of pork weighs 200 pounds.

Hawks can fly 150 miles in one hour.

Watches were first constructed in 1476.

Chinese in United States in 1880, 105,613.

Rome was founded by Romulus, 752 B.C.

Gold was discovered in California in 1848.

Phonograph invented by T. A. Edison, 1877.

The first balloon ascended from Lyons, France, 1783.

The first fire insurance office in America, Boston, 1724.

Jet is found along the coast of Yorkshire, Eng., near Whitby.

Napoleon I. crowned emperor, 1804; died at St. Helena, 1820.

Electric light invented by Lodyguin and Kossloff, at London, 1874.

Harvard is the oldest college in the United States; established in 1638.

War declared with Great Britain, June 19, 1812; peace, Feb. 18, 1815.

Until 1776 cotton spinning was performed by the hand spinning-wheel.

Measure 209 feet on each side and you will have a square acre within an inch.

Postage stamps first came into use in England in the year 1840; in the United States, in 1847.

The highest range of mountains are the Himalayas, the mean elevation being from 16,000 to 18,000 feet.

The largest inland sea is the Caspian; between Europe and Asia, being 700 miles long and 270 miles wide.

The term "Almighty Dollar" originated with Washington Irving, as a satire on the American love for gain.

## GEMS OF KNOWLEDGE.

- Envelopes were first used in 1839.  
Telescopes were invented in 1590.  
Iron horseshoes were made in 481.  
A barrel of flour weighs 196 pounds.  
A hand (horse measure) is four inches.  
A rifle ball moves 1,000 miles per hour.  
First steamer crossed the Atlantic, 1819.  
Assassination of Lincoln, April 14, 1865.  
German empire re-established, Jan. 18, 1871.  
Storm clouds move thirty-six miles an hour.  
First subscription library, Philadelphia, 1731.  
Dark Ages, from the 6th to the 14th century.  
The Latin tongue became obsolete about 580.  
The great London fire occurred Sept. 26, 1666.  
The value of a ton of pure gold is \$602,799.21.  
Ether was first used for surgical purposes in 1844.  
Ignatius Loyola founded the order of Jesuits, 1541.  
First authentic use of organs, 755; in England, 951.  
The first newspaper advertisement appeared in 1652.  
Cork is the bark taken from a species of the oak tree.  
Benjamin Franklin used the first lightning rods, 1752.  
Glass windows (colored) were used in the 8th century.  
Authentic history of China commenced 3,000 years B.C.  
Introduction of homœopathy into the United States, 1825.  
Spectacles were invented by an Italian in the 13th century.  
Medicine was introduced into Rome from Greece, 200 B.C.  
First electric telegraph, Paddington to Brayton, Eng., 1835.  
The Chaldeans were the first people who worked in metals.  
First life insurance, in London, 1772; in America, Phila., 1812.  
Egyptian pottery is the oldest known; dates from 2,000 B.C.  
Julius Cæsar invaded Britain, 55 B.C.; assassinated, 44 B.C.  
Soap was first manufactured in England in the 16th century.  
The largest free territorial government is the United States.  
First photographs produced in England, 1802; perfected, 1841.  
First marine insurance, A. D. 533; England, 1598; America, 1721.  
Professor Oersted, Copenhagen, discovered electro-magnetism, in 1819.  
First American express, New York to Boston—W. F. Harnden.  
Glass windows were first introduced into England in the 8th century.  
Chicago is little more than fifty years old, and is the eighteenth city of the world.  
Glass was made in Egypt, 3,000 B.C.; earliest date of transparent glass, 719 B.C.  
First public schools in America were established in the New England States about 1642.

## GEMS OF KNOWLEDGE.

First Atlantic cable operated, 1858.

A barrel of rice weighs 600 pounds.

The first steel pen was made in 1830.

Light moves 192,000 miles per second.

Slow rivers flow seven miles per hour.

The first lucifer match was made in 1829.

A storm moves thirty-six miles per hour.

Battles of Bunker Hill and Lexington, 1775.

The largest island in the world is Australia.

First musical notes used, 1338; printed, 1502.

Kerosene was first used for illuminating in 1826.

National banks first established in United States, 1816.

Slavery in the United States was begun at Jamestown in 1619.

First postoffice established, between Vienna and Brussels,

1516.

The Alexandrian Library contained 400,000 valuable books, 47 B.C.

Moscow, Russia, has the largest bell in the world, 432,000 pounds.

The highest denomination of United States legal tender notes is \$10,000.

The electric eel is only found in the northern rivers of South America.

Columbus discovered America, Oct. 12, 1492; the Northmen, A. D. 985.

The first theater in the United States was at Williamsburg, Va., 1752.

Congress declared war with Mexico, May 13, 1846; closed Feb. 2, 1848.

The first complete sewing machine was patented by Elias Howe, Jr., in 1846.

London is the largest city in the world, containing a population of 4,764,312 persons.

First cotton raised in the United States was in Virginia, in 1621; first exported, 1747.

The largest university is Oxford, in England. It consists of twenty-one colleges and five halls.

First sugar-cane cultivated in the United States, near New Orleans, 1751; first sugar-mill, 1758.

First telegraph in operation in America was between Washington and Baltimore, May 27, 1844.

The first illumination with gas was in Cornwall, Eng., 1792; in the United States, at Boston, 1822.

Printing was known in China in the 6th century; introduced into England about 1474; America, 1536.

The great wall of China, built 200 B.C., is 1,250 miles in length, 20 feet high, and 25 feet thick at the base.

Glass mirrors first made by Venetians in the 13th century. Polished metal was used before that time.

Meerschaum means "froth of the sea." It is white and soft when dug from the earth, but soon hardens.



## GEMS OF KNOWLEDGE.

America was discovered in 1492.

A firkin of butter weighs 56 pounds.

A span is ten and seven-eighths inches.

Pianoforte invented in Italy, about 1710.

The value of a ton of silver is \$37,704.84.

First watches made in Nuremberg, 1477.

A hurricane moves eighty miles per hour.

Modern needles first came into use in 1545.

Electricity moves 288,000 miles per second.

French and Indian War in America, 1754.

The first horse railroad was built in 1826-7.

The average human life is thirty-one years.

Coaches were first used in England in 1569.

French Revolution, 1789; Reign of Terror, 1793.

\$1,000,000 gold coin weigh 3,685.8 lbs. avoirdupois.

Mormons arrived at Salt Lake Valley, Utah, July 24, 1847.

Experiments in electric lighting, by Thomas A. Edison, 1878-80.

Daguerre and Nieper invented the process of daguerreotype, 1839.

The largest cavern in the world is the Mammoth Cave, Kentucky.

First American library founded at Harvard College, Cambridge, 1638.

The first iron ore discovered in this country was found in Virginia in 1715.

"Bravest of the Brave" was the title given to Marshal Ney at Friedland, 1807.

The first steam engine on this continent was brought from England in 1753.

The most extensive park is Deer Park in Denmark. It contains 4,200 acres.

Books in their present form were invented by Attalus, king of Pergamus, in 887.

Robert Raikes established the first Sunday-school, at Gloucester, Eng., 1781.

Albert Durer gave the world a prophecy of future wood engraving in 1527.

St. Augustine, oldest city in the United States, founded by the Spaniards, 1565.

Jamestown, Va., founded, 1607; first permanent English settlement in America.

The first volunteer fire company in the United States was at Philadelphia, 1736.

Oberlin College, Ohio, was the first in the United States that admitted female students.

The first knives were used in England, and the first wheeled carriages in France in 1559.

The largest park in the United States is Fairmount, at Philadelphia, and contains 2,740 acres.

## GEMS OF KNOWLEDGE.

The highest natural bridge in the world is at Rockbridge, Virginia, being 200 feet high to the bottom of the arch.

The largest circulation of paper money is that of the United States, being 700 millions, while Russia has 670 millions.

The largest insurance company in the world is the Mutual Life of New York City, having cash assets of \$168,000,000.

The largest empire in the world is that of Great Britain, being 8,557,658 square miles, and more than a sixth part of the globe.

The first electrical signal ever transmitted between Europe and America passed over the Field submarine cable on Aug. 5, 1858.

The longest tunnel in the world is St. Gothard, on the line of the railroad between Lucerne and Milan, being  $9\frac{1}{2}$  miles in length.

The loftiest active volcano is Popocatepetl. It is 17,784 feet high, and has a crater three miles in circumference and 1,000 feet deep.

Burnt brick were known to have been used in building the Tower of Babel. They were introduced into England by the Romans.

The most remarkable echo known is that in the castle of Simonetta, two miles from Milan. It repeats the echo of a pistol sixty times.

The largest volcano in the world is Etna. Its base is 90 miles in circumference; its cone 11,000 feet high. Its first eruption occurred 474 B.C.

The largest tree in the world, as yet discovered, is in Tulare County, California. It is 275 feet high, and 106 feet in circumference at its base.

The largest desert is Sahara, in Northern Africa. Its length is 3,000 miles and breadth 900 miles; having an area of 2,000,000 square miles.

The largest suspension bridge is the Brooklyn. The length of the main span is 1,595 feet 6 inches. The entire length of the bridge is 5,689 feet.

The first deaf and dumb asylum was founded in England, by Thomas Braidwood, 1760; and the first in the United States was at Hartford, 1817.

The largest diamond in the world is the Braganza, being a part of the Portuguese jewels. It weighs 1,880 carats. It was found in Brazil in 1741.

The grade of titles in Great Britain stands in the following order from the highest: A Prince, Duke, Marquis, Earl, Viscount, Baron, Baronet, Knight.

The "Valley of Death," in the island of Java, is simply the crater of an extinct volcano, filled with carbonic-acid gas. It is half a mile in circumference.

The city of Amsterdam, Holland, is built upon piles driven into the ground. It is intersected by numerous canals, crossed by nearly three hundred bridges.

Coal was used as fuel in England as early as 852, and in 1234 the first charter to dig for it was granted by Henry III. to the inhabitants of Newcastle-on-Tyne.

Tobacco was discovered in San Domingo in 1496; afterwards by the Spaniards in Yucatan in 1520. It was introduced in France in 1560, and into England in 1583.

The present national colors of the United States were not adopted by Congress until 1777. The flag was first used by Washington at Cambridge, January 1, 1776.

## GEMS OF KNOWLEDGE.

Paris was known as Lutetia until 1184, when the name of the great French capital was changed to that which it has borne ever since.

The longest span of wire in the world is used for a telegraph in India over the river Ristuah. It is over 6,000 feet, and is stretched between two hills, 1,200 feet high.

The largest library in the world is in Paris, founded by Louis XIV. It contains 1,400,000 volumes, 175,000 manuscripts, 300,000 maps and charts, and 150,000 coins and medals.

The tallest man was John Hale, of Lancashire, England, who was nine feet six inches in height. His hand was seventeen inches long and eight and one-half inches broad.

In round numbers, the weight of \$1,000,000 in standard gold coin is  $1\frac{3}{8}$  tons; standard silver coin,  $26\frac{3}{4}$  tons; subsidiary silver coin, 25 tons; minor coin, 5-cent nickel, 100 tons.

The part of United States territory most recently acquired is the island of San Juan, near Vancouver's Island. It was evacuated by England at the close of November, 1873.

The highest monument in the world is the Washington monument, being 555 feet. The highest structure of any kind is the Eiffel Tower, Paris, finished in 1889 and 989 feet high.

It is claimed that crows, eagles, ravens and swans live to be 100 years old; herons, 59; parrots, 60; pelicans and geese, 50; skylarks, 30; sparrow hawks, 40; peacocks, canaries and cranes, 24.

The greatest cataract in the world is Niagara, the height of the American Falls being 165 feet. The highest fall of water in the world is that of the Yosemite in California, being 2,550 feet.

The most ancient catacombs are those of the Theban kings, begun 4,000 years ago. The catacombs of Rome contain the remains of about 6,000,000 human beings; those of Paris, 3,000,000.

The quickest passage ever made across the Atlantic was that of the steamer Etruria, of the Cunard line, being 6 days 5 hours and 30 minutes from New York to Queenstown; the distance being 2,850 miles.

There has been no irregularity in the recurrence of leap year every four years since 1800, and will be none until 1900, which will be a common year, although it will come fourth after the preceding leap year.

The first English newspaper was the *English Mercury*, issued in the reign of Queen Elizabeth, and was issued in the shape of a pamphlet. The *Gazette* of Venice was the original model of the modern newspaper.

The Mormon Church in Utah shows a membership of 127,294—23,000 families. The church has 12 apostles, 58 patriarchs, 3,885 seventies, 3,153 high priests, 11,000 elders, 1,500 bishops, and 4,400 deacons, being an office for each six persons.

The seven sages flourished in Greece in the 6th century B.C. They were renowned for their maxims of life, and as the authors of the mottoes inscribed in the Delphian Temple. Their names are: Solon, Chilo, Pittacus, Bias, Periander, Cleobolus, and Thales.

The largest stationary engine in the world is at the zinc mines at Friedenville, Penn. The number of gallons of water raised every minute is 17,500. The driving wheels are 35 feet in diameter and weigh 40 tons each. The cylinder is 110 inches in diameter.

The largest number of cattle ever received in one year was that of Chicago in the year 1884, being 1,874,984 beeves, 30,223 calves, 5,640,625 hogs, 749,917 sheep, and 15,625 horses. It required 9,000 trains of 31 cars each, which, if coupled together, would reach 2,146 miles.

## GEMS OF KNOWLEDGE.

The estimated number of Christians in the world is over 408,000,000; of Buddhists, 420,000,000; of the followers of Brahma, 180,000,000; of Mohammedans, 150,000,000; of Jews, 8,000,000; of atheists, deists, and infidels, 85,000,000; of pagans, 50,000,000, and of the 1,100 other minor creeds, 123,000,000.

The largest producing farm in the world lies in the southwest corner of Louisiana, owned by a northern syndicate. It runs one hundred miles north and south. The immense tract is divided into convenient pastures, with stations of ranches every six miles. The fencing alone cost nearly \$50,000.

The "Seven Wonders of the World" are seven most remarkable objects of the ancient world. They are: The Pyramids of Egypt, Pharos of Alexandria, Walls and Hanging Gardens of Babylon, Temple of Diana at Ephesus, the Statue of the Olympian Jupiter, Mausoleum of Artemisia, and Colossus of Rhodes.

A "monkey wrench" is not so named because it is a handy thing to monkey with, or for any kindred reason. "Monkey" is not its name at all, but "Moncky." Charles Moncky, the inventor of it, sold his patent for \$2,000, and invested the money in a house in Williamsburgh, Kings County, N. Y., where he now lives.

The Union arch of the Washington Aqueduct is the largest in the world, being 220 feet; 20 feet in excess of the Chester arch across the Dee in England, 68 feet longer than that of the London Bridge; 92 feet longer than that at Neuilly on the Seine, and 100 feet longer than that of Waterloo Bridge. The height of the Washington arch is 100 feet.

The largest ship ever built, the Great Eastern, recently broken to pieces and sold to junk dealers, was designed and constructed by Scott Russell, at Maxwell, on the Thames. Work on the giant vessel was commenced in May, 1854. She was successfully launched January 13, 1858. The launching alone occupied the time from November 3, 1857, until the date above given. Her total length was 600 feet; breadth, 118 feet; total weight when launched, 12,000 tons. Her first trip of any consequence was made to New York in 1859-60.

In 1775 there were only twenty-seven newspapers published in the United States. Ten years later, in 1785, there were seven published in the English language in Philadelphia alone, of which one was a daily. The oldest newspaper published in Philadelphia at the time of the Federal convention was the *Pennsylvania Gazette*, established by Samuel Keimer, in 1728. The second newspaper in point of age was the *Pennsylvania Journal*, established in 1742 by William Bradford, whose uncle, Andrew Bradford, established the first newspaper in Pennsylvania, the *American Weekly Mercury*, in 1719. Next in age, but the first in importance, was the *Pennsylvania Packet*, established by John Dunlap in 1771. In 1784 it became a daily, being the first daily newspaper printed on this continent.

Statistics of twenty leading libraries in this country show that, of over \$500,000 spent, a little over \$170,000 spent was devoted to books, while other expenses consumed \$358,000. In the Mercantile Library of New York city it costs 14 cents to circulate a volume; in the Astor, 14½ cents are spent on each volume, or 27 cents on each reader; in Columbia College Library, 21½ cents per reader; in the Library Company of Philadelphia, 26 cents per volume, or 10 cents per head. The largest library in the world is the National Library of France, founded by Louis XIV., which now contains 1,400,000 books, 300,000 pamphlets, 175,000 manuscripts, 300,000 maps and charts, 150,000 coins and medals, 1,300,000 engravings, and 100,000 portraits. The Library of Congress is the largest in this country, as it contained 570,000 volumes in 1886. The Mercantile Library of Philadelphia was the seventh in point of size in this country in the same year. There are in the United States 5,338 libraries.

The most extensive mines in the world are those of Freiberg, Saxony. They were begun in the twelfth century, and in 1835 the galleries, taken collectively, had reached the unprecedented length of 123 miles. A new gallery, begun in 1838, had reached a length of eight miles at the time of the census of 1878. The deepest perpendicular mining shaft in the world is located at Prizlram, Bohemia. It is a lead mine; it was begun 1832. January, 1880, it was 3,280 feet deep. The deepest coal mine in the world is near Tournay, Belgium; it is 3,542 feet in depth, but, unlike the lead mine mentioned above, it is not perpendicular. The deepest rock-salt bore in the world is near Berlin, Prussia; it is 4,185 feet deep. The deepest hole ever bored into the earth is the artesian well at Potsdam, which is 5,500 feet in depth. The deepest coal mines in England are the Dunkirk collieries of Lancashire, which are 2,824 feet in depth. The deepest coal shaft in the United States is located at Pottsville, Pa. In 1885 it had reached a depth of 1,576 feet. From this great depth 400 cars, holding four tons each, are hoisted daily. The deepest silver mine in the United States is the Yellow Jacket, one of the great Comstock system at Virginia City, Nevada; the lower levels are 2,700 feet below the hoisting works.

The largest locomotive ever constructed prior to 1880 was that made at the Baldwin Locomotive Works during the early part of 1879. It was turned out ready for use April 10th of that year and named Uncle Dick. Uncle Dick weighed 130,000 pounds; was sixty feet from headlight to the rear end of the tender. He is now at work on the Atchison, Topeka & Santa Fe road. During the year 1883 the same works that constructed Uncle Dick turned out several locomotives for the Northern Pacific railroad, each weighing 180,000 pounds. During the same year, as if to overshadow the Baldwin works, the Central Pacific company caused to be built at their shops in Sacramento, Cal., what are really the largest locomotives in the world. They have eight drive-wheels each, the cylinders are 19 inches in diameter, and the stroke three feet. These engines weigh, with the tender, as Uncle Dick's weight was given, almost 100,000 pounds. The Baldwin Works, in 1889, completed for the Northern Pacific an engine weighing, with tender, 225,000 pounds.

"Liberty," Bartholdi's statue, presented to the United States by the French people in 1885, is the largest statue ever built. Its conception is due to the great French sculptor whose name it bears. It is said to be a likeness of his mother. Eight years of time were consumed in the construction of this gigantic brazen image. Its weight is 440,000 pounds, of which 146,000 pounds are copper, the remainder iron and steel. The major part of the iron and steel was used in constructing the skeleton frame work for the inside. The mammoth electric light held in the hand of the giantess is 305 feet above tide-water. The height of the figure is 152½ feet; the pedestal 91 feet, and the foundation 52 feet and 10 inches. Forty persons can find standing-room within the mighty head, which is 14½ feet in diameter. A six-foot man standing on the lower lip could hardly reach the eyes. The index finger is eight feet in length and the nose 3¾ feet. The Colossus of Rhodes was a pigmy compared with this latter day wonder.

The largest stone bridge on the face of the earth is that finished in May, 1885, at Lagang, China. Chinese engineers had sole control of its construction. It crosses an arm of the China Sea, is nearly six miles in length, is composed entirely of stone, and has 300 arches, each 70 feet high. It is the most colossal structure ever reared by man, yet we sneer at the "heathen Chinese." The largest truss iron bridge in the world crosses the Firth of Tay, Scotland. It is 18,612 feet in length and composed of eighty-five spans. The longest wooden bridge in the world is that crossing Lake Ponchartrain, near New Orleans, La. It is a trestle-work twenty-one miles in length, built of cypress piles which have been saturated with creosote oil to preserve them. The highest bridge in the United States is over Kinzina Creek, near Bradford, Pa. It was built in 1882, has a total span of 2,051 feet and is 301 feet above the creek bed.

## GEMS OF KNOWLEDGE.

The "Centennial ox," bred by Samuel Barkley of Somerset County, Pa., was the largest specimen of the bovine the world has ever seen. He weighed 4,900 pounds the day he arrived in Philadelphia. This mountain of beef was of mixed stock, being short-horn, native, "scrub," and Ayrshire, the short-horn predominating. After the exhibition was ended the giant ox was butchered and exhibited as "show beef" at Philadelphia during the holidays of 1876. A short-horn steer weighing 4,100 pounds was slaughtered at Detroit in 1874. A. N. Meal of Moberly, Mo., formerly owned the largest cow in the world. Mr. Meal disposed of her in 1883, the Cole Circus Company being the purchasers. She weighed the day of sale 3,296 pounds. Mr. John Pratt of Chase County, Kan., was formerly the owner of a cow weighing 3,200 pounds. She was of the common "scrub" stock and stood nineteen hands high.

The great pyramid of Ghizeh is the largest structure of any kind ever erected by the hand of man. Its original dimensions at the base were 764 feet square, and its perpendicular height in the highest point 488 feet; it covers four acres, one rood, and twenty-two perches of ground and has been estimated by an eminent English architect to have cost not less than £30,000,000, which in United States currency would be about \$145,200,000. Internal evidence proves that the great pyramid was begun about the year 2170 B.C., about the time of the birth of Abraham. It is estimated that about 5,000,000 tons of hewn stone were used in its construction, and the evidence points to the fact that these stones were brought a distance of about 700 miles from quarries in Arabia.

The largest and grandest temple of worship in the world is the St. Peter's Cathedral at Rome. It stands on the site of Nero's circus, in the northwest part of the city, and is built in form of a Latin cross. The total length of the interior is 612½ English feet; transept, 446½ feet; height of nave, 152½ feet; diameter of cupola, 193 feet; height of dome from pavement to top of cross, 448 feet. The great bell alone without the hammer or clapper weighs 18,600 pounds, or over 9¼ tons. The foundation was laid in 1450 A.D. Forty-three Popes lived and died during the time the work was in progress. It was dedicated in the year 1826, but not entirely finished until the year 1880. The cost, in round numbers, is set down at \$70,000,000.

The Capitol building at Washington, D. C., is the largest building in the United States. The corner stone was laid December 18th, 1793, by President Washington, assisted by other Masons. It was partially destroyed by the British in 1814. The present dome was begun in 1855 and finished in 1863. The flag of the United States first floated from it December 12th, 1863. The cost of the entire building has been something over \$13,000,000. Its length is 715 feet 4 inches; width, 324 feet. It covers 3¼ acres of ground. The distance from the ground to the top of the dome is 307½ feet; diameter of the dome, 135½ feet—making fifth as to size with the greatest domes of the world.

The largest and costliest private mansion in the world is that belonging to Lord Bute, called Montstuart, and situated near Rothesay, England. It covers nearly two acres; is built in gothic style; the walls, turrets and balconies are built of stone. The immense tower in the center of the building is 120 feet high, with a balcony around the top. The halls are constructed entirely of marble and alabaster, and the rooms are finished in mahogany, rosewood and walnut. The fire-places are all carved marbles of antique design. The exact cost of this fairy palace is not known, but it has never been estimated at less than \$8,000,000.

The largest body of fresh water in the world is Lake Superior. It is 400 miles long and 180 miles wide; its circumference, including the windings of its various bays, has been estimated at 1,800 miles. Its area in square miles is 32,000, which is greater than the whole of New England, leaving out Maine. The greatest depth of this inland sea is 200 fathoms, or 1,200 feet. Its average depth is about 160 fathoms. It is 636 feet above sea level.



## GEMS OF KNOWLEDGE.

The corner stone of the Washington monument, the highest in the United States, and until 1889 the highest in the world, was laid July 4th, 1848. Robert E. Winthrop, then the Speaker of the House, delivered the oration. Work progressed steadily for about six years, until the funds of the monumental society became exhausted. At that time the monument was about 175 feet high. From 1854 until 1879 nothing of was done on the building. In the year last above named Congress voted an appropriation of \$200,000 to complete the work. From that time forward work progressed at a rapid rate until December 6th, 1884, when the aluminum apex was set at 555 feet  $5\frac{1}{2}$  inches from the foundation and the work declared finished. The foundation is  $146\frac{1}{2}$  feet square; number of stones used above the 130-foot level, 9,163; total weight stone used in work, 81,120 tons.

The famous Corliss engine, the largest ever constructed, and the one used to drive the machinery in the great hall at the Centennial of 1876, is now in the shops of the Pullman Car Company at Pullman, near Chicago, Ill. The writer is aware that this differs from other statements that have been made, it being generally supposed that the Emperor of Brazil bought the engine and removed it to his own country. He did talk of buying it, but the bargain was never consummated. This tireless giant works in an upright position, is over 40 feet high, of 1,400 horse-power, and has two 40-inch cylinders and a 10-foot stroke.

The largest ferry-boat ever constructed was named the Solano, and is now in use daily conveying trains across the Straits of Carquinez, between Benecia and Port Costa. The Solano is 460 feet long, 116 feet wide, and 20 foot depth of hold. She has eight steel boilers, four rudders, and a tonnage of 3,841 tons. On her decks are four railway tracks, with capacity for 48 ordinary freight cars and two locomotives, or 28 passenger coaches of the largest build.

The highest building in the world, not counting the Eiffel tower and the Washington monument, is the Cologne cathedral. The height from the pavement to the top of the cupola is 511 feet. It is 511 feet long, exactly the same as the height, and 231 feet wide. It was begun August 15th in the year 1248, and was pronounced finished August 14th, 1880, over 600 years after the corner stone was laid.

The highest mountain on the globe is not, as is generally supposed, Mt. Everest, that honor belonging to a lofty peak named Mt. Hercules on the Isle of Papua, New Guinea, discovered by Capt. Lawson in 1881. According to Lawson, this monster is 32,763 feet in height, being 3,781 feet higher than Mt. Everest, which is only 29,002 feet above the level of the Indian ocean.

The largest State in our grand republic is Texas, which contains 274,356 square miles, capable of sustaining 20,000,000 of people, and then it would not be more crowded than Scotland is at present. It has been estimated that the entire population of the globe could be seated upon chairs within the boundary of Texas and each have four feet of elbow room.

The largest anvil is that used in the Woolwich Arsenal, England. It weighs sixty tons. The anvil block upon which it rests weighs 103 tons. Altogether 600 tons of iron were used in the anvil, the block and the foundation work. It is said to have been six months cooling before it was sufficiently hard to stand the shock of the immense hammer.

The Mississippi river, from the source of the Missouri to the Eads jetties, is the longest river in the world. It is 4,300 miles in length and drains an area of 1,726,000 square miles. The Amazon, which is without doubt the widest river in the world, including the Beni, is 4,000 miles in length and drains 2,330,000 square miles of territory.

The largest school in the world is the Jews' free school of Spitalsfield, Eng., which has a daily attendance of 2,800 pupils.

## GEMS OF KNOWLEDGE.

New Orleans boasts the largest custom-house in this or any other land. It was begun in 1848 and over thirty years elapsed before it was finished and ready for use. It is built of Quincy granite, the interior being finished in finest marble. It has 111 rooms; height from the pavement to the top of the cornice is eighty feet, and to the top of the light on the dome 187 feet. The dome itself is 49 feet square and 61 feet high; estimated total cost of building, \$4,900,000.

The largest hotel in the United States, and probably the largest in the world, is located at San Francisco, Cal. It is nine stories high and cost \$3,500,000. It is named the Palace and has accommodations for 1,500 guests.

Paris claims the finest theater in the world. It is of solid stone, finished with marble floors, and covers about four acres of ground. La Scala, of Milan, has the largest seating capacity, while the Auditorium at Chicago, completed in 1889, seating 7,000 people, ranks second in that respect.

### The Name of God in Forty-eight Languages.

Hebrew .....	Eleah, Jehovah	Olotu tongue .....	Deu
Chaldaic .....	Eiliah	German and Swiss .....	Gott
Assyrian .....	Eleah	Flemish .....	God
Syrian and Turkish ....	Alah	Dutch .....	God
Malay .....	Alla	English .....	God
Arabic .....	Allah	Teutonic .....	Goth
Languages of the Magi..	Orsi	Danish and Swedish .....	Gud
Old Egyptian .....	Teut	Norwegian .....	Gud
Armenian .....	Teuti	Slav .....	Buch
Modern Egyptian ..	Teun	Polish .....	Bog
Greek .....	Theos	Polacca .....	Bung
Cretan .....	Thios	Lapp .....	Jubinal
Aedian and Dorian ....	Ilos	Finnish .....	Jumala
Latin .....	Deus	Runic .....	As
Low Latin .....	Diex	Zemblian .....	Fetiza
Celtic Gaelic .....	Diu	Pannonian .....	Istu
French .....	Dieu	Hindostanee .....	Rain
Spanish .....	Dios	Coromandel .....	Brama
Portuguese .....	Deos	Tartar .....	Magatai
Old German .....	Diet	Persian .....	Sire
Provincial .....	Diou	Chinese .....	Prussa
Low Breton .....	Done	Japanese .....	Goezer
Italian .....	Dio	Madagascar .....	Zannar
Irish .....	Dia	Peruvian .....	Puchecammae

**COMPARATIVE COST OF FREIGHT BY WATER AND RAIL.**—It has been proved by actual test that a single tow-boat can transport at one trip from the Ohio to New Orleans 29,000 tons of coal, loaded in barges. Estimating in this way, the boat and its tow, worked by a few men, carries as much freight to its destination as 3,000 cars and 100 locomotives, manned by 600 men, could transport.

## LOISETTE'S SYSTEM OF MEMORY.

SO MUCH has been said about Loiset's memory system, the art has been so widely advertised, and so carefully guarded from all the profane who do not send five or many dollars to the Professor, that a few pages showing how every man may be his own Loiset, may be both interesting and valuable.

In the first place, the system is a good one, and well worth the labor of mastering, and if the directions are implicitly followed there can be no doubt that the memory will be greatly strengthened and improved, and that mnemonic feats otherwise impossible may be easily performed. Loiset, however, is not an inventor, but an introducer. He stands in the same relation to Dr. Pick that the retail dealer holds to the manufacturer: the one produced the article; the other brings it to the public. Even this statement is not quite fair to Loiset, for he has brought much practical common sense to bear upon Pick's system, and, in preparing the new art of mnemonics for the market, in many ways he has made it his own.

If each man would reflect upon the method by which he himself remembers things, he would find his hand upon the key of the whole mystery. For instance, the author was once trying to remember the word *blythe*. There occurred to my mind the words "Bellman," "Belle," and then the verse:

" — the peasant upward climbing  
Hears the bells of *Buloss* chiming."

"Barcarole," "Barrack," and so on until finally the word "blythe" presented itself with a strange insistence, long after I had ceased trying to recall it.

On another occasion, when trying to recall the name "Richardson," I got the words "hay-rick," "Robertson," "Randallstown," and finally "wealthy," from which, naturally, I got "rich" and "Richardson" almost in a breath.

Still another example: trying to recall the name of an old schoolmate, "Grady," I got "Brady," "grave," "gaseous," "gastromome," "gracious," and I finally abandoned the attempt, simply saying to myself that it began with a "G," and there was an "a" sound after it. The next morning, when thinking of something entirely different, this name "Grady" came up in my mind with as much distinctness as though someone had whispered it in my ear. This remembering was done without any conscious effort on my part, and was evidently the result of the exertion made the day before when the mnemonic processes were put to work. Every reader must have had a similar experience which he can recall, and which will fall in line with the examples given.

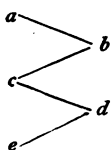
## LOISETTE'S SYSTEM OF MEMORY.

It follows, then, that when we endeavor, without the aid of any system, to recall a forgotten fact or name, our memory presents to us words of similar sound or meaning in its journey toward the goal to which we have started it. This goes to show that our ideas are arranged in groups in whatever secret cavity or recess of the brain they occupy, and that the arrangement is one not alphabetical exactly, and not entirely by meaning, but after some fashion partaking of both.

If you are looking for the word "meadow" you may reach "middle" before you come to it, or "Mexico," or many words beginning with the "m" sound, or containing the "dow," as "window" or "dough," or you may get "field" or "farm"—but you are on the right track, and if you do not interfere with your intellectual process you will finally come to the idea which you are seeking.

How often have you heard people say, "I forget his name, it is something like Beadle or Beagle—at any rate it begins with a B." Each and all of these were unconscious Loisetians, and they were practicing blindly, and without proper method or direction, the excellent system which he teaches. The thing, then, to do—and it is the final and simple truth which Loiset teaches—is to travel over this ground in the other direction—to cement the fact which you wish to remember to some other fact or word which you know will be brought out by the implied conditions—and thus you will always be able to travel from your given starting-point to the thing which you wish to call to mind.

To illustrate: let the broken line in the annexed diagram represent a train of thought. If we connect the idea "a" with



"e" through the steps *b*, *c* and *d*, the tendency of the mind ever afterwards will be to get to *e* from *a* that way, or from any of the intermediates that way. It seems as though a channel were cut in our mind-stuff along which the memory flows. How to make it flow this way will be seen later on. Loiset, in common with all the mnemonic teachers, uses the old device of representing numbers by letters—and as this is the first and easiest step in the art, this seems to be the most logical place to introduce the accepted equivalents of the Arabic numerals :

- ① is always represented by *s*, *z* or *c* soft.
- 1 is always represented by *t*, *th* or *d*.
- 2 is always represented by *n*.
- 3 is always represented by *m*.
- 4 is always represented by *r*.
- 5 is always represented by *l*.
- 6 is always represented by *sh*, *j*, *ch* soft or *g* soft.

# LOISETTE'S SYSTEM OF MEMORY.

**7** is always represented by *g* hard, *k* *c* hard, *q* or final *ng*.

**8** is always represented by *f* or *v*.

**9** is always represented by *p* or *b*.

All the other letters are used simply to fill up. Double letters in a word count only as one. In fact the system goes by sound, not by spelling—for instance “this” or “dizzy” would stand for *ten*; “catch” or “gush” would stand for *76*, and the only difficulty is to make some word or phrase which will contain only the significant letters in the proper order, filled out with non-significants into some guise of meaning or intelligibility.\* Suppose you wished to get some phrase or word that would express the number 3685, you arrange the letters this way :

	<b>3</b>	—	<b>6</b>	—	<b>8</b>	—	<b>5</b>
a	m	a	sh	a	f	a	l
e		e	j	e	v	e	
i		i	ch	i		i	
o		o	g	o		o	
u		u		u		u	
h		h		h		h	
w		w		w		w	
x		x		x		x	
y		y		y		y	

You can make out “image of law,” “my shuffle,” “matchville,” etc., etc., as far as you like to work it out.

Now, suppose you wished to memorize the fact that \$1,000,000 in gold weighs 3,685 pounds, you go about it in this way, and here is the kernel and crux of Loisettes system :

“How much does \$1,000,000 in gold weigh?”

“Weigh—scales.”

“Scales—statue of Justice.”

“Statue of Justice—*image of law*.”

The process is simplicity itself. The thing you wish to recall, and that you fear to forget, is the weight; consequently you cement your chain of suggestion to the idea which is most

\* You can remember the equivalents by noting the fact that *z* is the first letter of “zero,” and *c* of “cipher,” *t* has but one stroke, *n* has two, *m* three. The script *f* is very like 8, the script *p* like 9; *r* is the last letter of four, *l* is the roman numeral for fifty, which suggests five. The others may be retained as memorizing these two nonsense lines :

Six *sky* Jewesses chase George  
Seven great kings came quarreling.

prominent in your mental question. What do you weigh with? Scales. What does the mental picture of scales suggest? The statue of Justice, blindfolded and weighing out award and punishment to man. Finally, what is this statue of Justice but the image of law? and the words "image of law," translated back from the significant letters *m, g* soft, *f* and *l*, give you 3-6-8-5, the number of pounds in \$1,000,000 in gold. You bind together in your mind each separate step in the journey, the one suggests the other, and you will find a year from now that the fact will be as fresh in your memory as it is to-day. You cannot lose it. It is chained to you by an unbreakable mnemonic tie. Mark, that it is not claimed that "weight" will of itself suggest "scales" and "scales" "statue of Justice," etc., but that, having once passed your attention up and down that ladder of ideas, your mental tendency will be to take the same route, and get to the same goal again and again. Indeed, beginning with the weight of \$1,000,000, "image of law" will turn up in your mind without your consciousness of any intermediate station on the way, after some iteration and reiteration of the original chain.

Again, so as to fasten the process in the reader's mind even more firmly, suppose that it were desired to fix the date of the battle of Hastings (A. D. 1066) in the memory; 1066 may be represented by the words "the wise judge" (*th* = 1, *s* = 0, *j* = 6, *dg* = 6; the others are non-significants); a chain might be made thus:

Battle of Hastings—arbitrament of war.

Arbitrament of war—arbitration.

Arbitration—judgment.

Judgment—the wise judge.

Make mental pictures, connect ideas, repeat words and sounds, go about it any way you please, so that you will form a mental habit of connecting the "battle of Hastings" with the idea of "arbitrament of war," and so on for the other links in the chain, and the work is done.

Loisette makes the beginning of his system unnecessarily difficult, to say nothing of his illogical arrangement in the grammar of the art of memory, which he makes the first of his lessons. He analyzes suggestion into—

1. Inclusion.-
2. Exclusion.
3. Concurrence.

All of which looks very scientific and orderly, but is really misleading, and badly named. The truth is that one idea will suggest another.

1. By likeness or opposition of meaning, as "house" suggests



## LOISETTE'S SYSTEM OF MEMORY.

"room" or "door," etc.; or, "white" suggests "black," "cruel," "kind," etc.

2. By likeness of sound, as "harrow" and "barrow"; "Henry" and "Hennepin."

3. By mental juxtaposition, a peculiarity different in each person, and depending upon each one's own experiences. Thus, "St. Charles" suggests "railway bridge" to me, because I was vividly impressed by the breaking of the Wabash bridge at that point. "Stable" and "broken leg" come near each other in my experience, so do "cow" and "shot-gun" and "licking."

Out of these three sorts of suggestion it is possible to get from any one fact to any other in a chain certain and safe, along which the mind may be depended upon afterwards always to follow.

The chain is, of course, by no means all. Its making and its binding must be accompanied by a vivid, methodically directed attention, which turns all the mental light gettable in a focus upon the subject passing across the mind's screen. Before Loisetete was thought of this was known. In the old times in England, in order to impress upon the mind of the rising generation the parish boundaries in the rural districts, the boys were taken to each of the landmarks in succession, the position and bearings of each pointed out carefully, and, in order to deepen the impression, the young people were then and there vigorously thrashed, a mechanical method of attracting the attention which was said never to have failed. This system has had its supporters in many of the old-fashioned schools, and there are men who will read these lines who can recall, with an itching sense of vivid expression, the 144 lickings which were said to go with the multiplication table.

In default of a thrashing, however, the student must cultivate as best he can an intense fixity of perception upon every fact or word or date that he wishes to make permanently his own. It is easy. It is a matter of habit. If you will you can photograph an idea upon your cerebral gelatine so that neither years nor events will blot it out or overlay it. You must be clearly and distinctly aware of the thing you are putting into your mental treasure-house, and drastically certain of the cord by which you have tied it to some other thing of which you are sure. Unless it is worth your while to do this, you might as well abandon any hope of mnemonic improvement, which will not come without the hardest kind of hard work, although it is work that will grow constantly easier with practice and reiteration.

You need, then :

1. Methodic suggestion.
2. Methodic attention.
3. Methodic reiteration.

## LOISETTE'S SYSTEM OF MEMORY.

And this is all there is to Loiset, and a great deal it is. Two of them will not do without the third. You do not know how many steps there are from your hall door to your bed-room, though you have attended to and often reiterated the journey. But if there are twenty of them, and you have once bound the word "nice," or "nose," or "news," or "hyenas," to the fact of the stairway, you could never forget it.

The Professor makes a point, and very wisely, of the importance of working through some established chain, so that the whole may be carried away in the mind—not alone for the value of the facts so bound together, but for the mental discipline so afforded.

Here, then, is the "President Series," which contains the name and the date of inauguration of each president from Washington to Cleveland. The manner in which it is to be mastered is this: Beginning at the top, try to find in your mind some connection between each word and the one following it. See how you can at some future time make one suggest the next, either by suggestion of sound or sense, or by mental juxtaposition. When you have found this dwell on it attentively for a moment or two. Pass it backward and forward before you, and then go on to the next step.

The chain runs thus, the names of the presidents being in small caps, the date words in italics:

President..	.....	Chosen as the first word as the one most apt to occur to the mind of any one wishing to repeat the names of the presidents.
Dentist.....		<i>President and dentist.</i>
Draw.....		What does a dentist do?
To give up.....		When something is drawn from one it is given up. This is a date phrase meaning 1789.
Self-sacrifice.....		There is an association of thought between giving up and self-sacrifice.
WASHINGTON .....		Associate the quality of self-sacrifice with Washington's character.
Morning wash.....		<i>Washington and wash.</i>
Dew.....		Early wetness and dew.
Flower beds.....		Dew and flowers.
Took a bouquet.....		Flowers and bouquet. Date phrase (1797).
Garden.....		Bouquet and garden.
Eden.....		The first garden.
Adam.....		Juxtaposition of thought.
ADAMS.....		Suggestion by sound.
Fall.....		Juxtaposition of thought.
Failure.....		Fall and failure.
Deficit.....		Upon a failure there is usually a deficit. Date word (1801).
Debt.....		The consequence of a deficit.
Bonds.....		Debt and bonds.
Confederate bonds.....		Suggestion by meaning.
Jefferson Davis.....		Juxtaposition of thought.
JEFFERSON.		

Now follow out the rest for yourself, taking about ten at a time, and binding those you do last to those you have done before each time, before attacking the next bunch.

# LOISETTE'S SYSTEM OF MEMORY.

1	2	3
JEFFERSON	<i>the fraud</i>	<i>the heavy shell</i>
Judge Jeffreys	painted clay	mollusk
bloody assize	baked clay	unfamiliar word
bereavement	tiles	dictionary
<i>too heavy a sob</i>	TYLER	Johnson's
parental grief	Wat Tyler	JOHNSON
mad son	poll tax	son
MADISON	compulsory	bad son
Madeira	<i>free will</i>	dishonest boy
first-rate wine	free offering	<i>thievish boy</i>
frustrating	burnt offering	take
<i>defeating</i>	poker	give
feet	POLK	GRANT
toe the line	end of dance	award
row	termination "ly"	school premium
MONROE	<i>adverb</i>	examination
row	part of speech	cramming
boat	part of a man	<i>fagging</i>
steamer	TAYLOR	laborer
<i>the funnel</i>	measurer	hay field
windpipe	theodolite	HAYES
throat	<i>Theophilus</i>	hazy
quinty	fill us	clear
QUINCY ADAMS	FILLMORE	<i>vivid</i>
quince	more fuel	brightly lighted
fine fruit	<i>the flame</i>	camp fire
<i>the fine boy</i>	flambeau	war field
sailor boy	bow	GARFIELD
sailor	arrow	Guiteau
jack tar	PIERCE	murderer
JACKSON	hurt	prisoner
stone wall	<i>feeling</i>	prison fare
indomitable	wound	<i>half fed</i>
<i>tough make</i>	soldier	well fed
oaken furniture	cannon	well read
bureau	BUCHANAN	author
VAN BUREN	rebuke	ARTHUR
rent	official censure	round table
side-splitting	<i>to officiate</i>	tea table
<i>divert</i>	wedding	tea cup
annoy	linked	<i>half full</i>
harassing	LINCOLN	divide
HARRISON	link	cleave
Old Harry	stroll	CLEVELAND
the tempter	sea shore	

# LOISETTE'S SYSTEM OF MEMORY.

It will be noted that some of the date words, as "free will," only give three figures of the date, 845; but it is to be supposed that if the student knows that many figures in the date of Polk's inauguration he can guess the other one.

The curious thing about this system will now become apparent. If the reader has learned the series so that he can say it down, from President to Cleveland, he can with no effort, and without any further preparation, say it *backwards* from Cleveland up to the commencement! There could be no better proof that this is the natural mnemonic system. It proves itself by its works.

The series should be repeated backwards and forwards every day for a month, and should be supplemented by a series of the reader's own making, and by this one, which gives the numbers from 0 to 100, and which must be chained together before they can be learned.

0—hoes		
1—wheat	34—mare	67—jockey
2—hen	35—mill	68—shave
3—home	36—image	69—ship
4—hair	37—mug	70—eggs
5—oil	38—muff	71—gate
6—shoe	39—mob	72—gun
7—hook	40—race	73—comb
8—off	41—hart	74—hawker
9—bee	42—horn	75—coal
10—daisy	43—army	76—cage
11—tooth	44—warrior	77—cake
12—dine	45—royal	78—coffee
13—time	46—arch	79—cube
14—tower	47—rock	80—vase
15—dell	48—wharf	81—feet
16—ditch	49—rope	82—vein
17—duck	50—wheels	83—fame
18—dove	51—lad	84—fire
19—tabby	52—lion	85—vial
20—hyenas	53—lamb	86—fish
21—hand	54—lair	87—fig
22—nun	55—lily	88—fife
23—name	56—lodge	89—fib
24—owner	57—lake	90—pies
25—nail	58—leaf	91—putty
26—hinge	59—elbow	92—pane
27—ink	60—chess	93—bomb
28—knife	61—cheat	94—bier
29—knob	62—chain	95—bell
30—muse	63—sham	96—peach
31—mayday	64—chair	97—book
32—hymen	65—jail	98—beef
33—mama	66—judge	99—pope
100—diocese		

## LOISETTE'S SYSTEM OF MEMORY.

By the use of this table, which should be committed as thoroughly as the President series, so that it can be repeated backwards and forwards, any date, figure or number can be at once constructed, and bound by the usual chain to the fact which you wish it to accompany.

When the student wishes to go farther and attack larger problems than the simple binding of two facts together, there is little in Loiset's system that is new, although there is much that is good. If it is a book that is to be learned as one would prepare for an examination, each chapter is to be considered separately. Of each a *precis* is to be written in which the writer must exercise all of his ingenuity to reduce the matter in hand to its final skeleton of fact. This he is to commit to memory both by the use of the chain and the old system of interrogation. Suppose after much labor through a wide space of language one boils a chapter or an event down to the final irreducible sediment: "Magna Charta was exacted by the barons from King John at Runnymede."

You must now turn this, statement this way and that way; asking yourself about it every possible and impossible question, gravely considering the answers, and, if you find any part of it especially difficult to remember, chaining it to the question which will bring it out. Thus, "What was exacted by the barons from King John at Runnymede?" "Magna Charta." "By whom was Magna Charta exacted from King John at Runnymede?" "By the barons." "From whom was," etc., etc.? "King John." "From what king," etc., etc.? "King John." "Where was Magna Charta," etc., etc.? "At Runnymede."

And so on and so on, as long as your ingenuity can suggest questions to ask, or points of view from which to consider the statement. Your mind will be finally saturated with the information, and prepared to spill it out at the first squeeze of the examiner. This, however, is not new. It was taught in the schools hundreds of years before Loiset was born. Old newspaper men will recall in connection with it Horace Greeley's statement that the test of a news item was the clear and satisfactory manner in which a report answered the interrogatories, "What?" "When?" "Where?" "Who?" "Why?"

In the same way Loiset advises the learning of poetry, *e. g.*,

"The Assyrian came down like a wolf on the fold."

"Who came down?"

"How did the Assyrian come down?"

"Like what animal did?" etc.

And so on and so on, until the verses are exhausted of every scrap of information to be had out of them by the most assiduous cross-examination.

## LOISETTE'S SYSTEM OF MEMORY.

Whatever the reader may think of the availability or value of this part of the system, there are so many easily applicable tests of the worth of much that Loisetle has done, that it may be taken with the rest.

Few people, to give an easy example, can remember the value of  $\pi$ —the ratio between the circumference and the diameter of the circle—beyond four places of decimals, or at most five—

3. 141592 + . Here is the value to 108 decimal places:

3. 14159265358979323846264338327950288419716939937510582  
09749445923078164062862089986280348253421170679821480  
86 +

By a very simple application of the numerical letter values, these 108 decimal places can be carried in the mind and recalled about as fast as you can write them down. All that is to be done is to memorize these nonsense lines:

Mother Day will buy any shawl.

My love pick up my new muff.

A Russian jeer may move a woman.

Cables enough for Utopia.

Get a cheap ham pie by my cooley.

The slave knows a bigger ape.

I rarely hop on my sick foot.

Cheer a sage in a fashion safe.

A baby fish now views my wharf.

Annually Mary Ann did kiss a jay.

A cabby found a rough savage.

Now translate each significant into its proper value and you have the task accomplished. "Mother Day,"  $m=3$ ,  $th=1$ ,  $r=4$ ,  $d=1$ , and so on. Learn the lines one at a time by the method of interrogatories. "Who will buy any shawl?" "Which Mrs. Day will buy a shawl?" "Is Mother Day particular about the sort of shawl she will buy?" "Has she bought a shawl?" etc., etc. Then cement the end of each line to the beginning of the next one, thus, "Shawl"—"warm garment"—"warmth"—"love"—"my love," and go on as before. Stupid as the work may seem to you, you can memorize the figures in fifteen minutes this way so that you will not forget them in fifteen years. Similarly you can take Haydn's Dictionary of Dates and turn fact after fact into nonsense lines like these which you cannot lose.

And this ought to be enough to show anybody the whole art. If you look back across the sands of time and find out that it is that ridiculous old "Thirty days hath September" which comes to you when you are trying to think of the length of October—if you can quote your old prosody,

"O datur ambiguus," etc.,

with much more certainty than you can serve up your Horace; if

## LOISETTE'S SYSTEM OF MEMORY.

in fine, jingles and alliterations, wise and otherwise, have stayed with you, while solid and serviceable information has faded away, you may be certain that here is the key to the enigma of memory.

You can apply it yourself in a hundred ways. If you wish to clinch in your mind the fact that Mr. Love lives at 485 Dearborn Street, what is more easy than to turn 485 into the word "rifle" and chain the ideas together, say thus: "LOVE—happiness—good time—picnic—forest—wood rangers—range—rifle range—*rifle*—fine weapon—costly weapon—dearly bought—DEARBORN."

Or if you wish to remember Mr. Bowman's name, and you notice he has a mole on his face which is apt to attract your attention when you next see him, cement the ideas thus: "Mole, mark, target, archer, Bowman."

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**THE COPYING PAD.**—Put 1 ounce of glue to soak in cold water until pliable and soft. Drain off the surplus water and place the dish in another dish containing hot water. When the glue is thoroughly melted, add 6 ounces of glycerine, which has been previously heated, and mix the two, adding a few drops of carbolic acid to prevent molding. Pour out this mixture into a shallow pan (9x12 inches) and set away to cool, taking care that the surface is free from blisters. After standing 12 hours it is ready for use. To use, write on a sheet of paper what you wish to duplicate with a sharp steel pen and strong aniline ink. When dry, lay the paper face down on the pad, pressing it lightly, and allow it to remain for a moment. On removing the paper an impression will be found on the face of the pad, and if another paper is placed upon it, it will receive a similar impression. When enough impressions have been taken, the face of the pad should be immediately washed with a sponge and cold water until the ink impression is wholly removed. If the surface of the pad becomes dry, wipe it with a moist sponge, and, if uneven, melt over a slow fire.

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**HOW TO RAISE THE BODY OF A DROWNED PERSON.**—In a recent failure to recover the body of a drowned person in New Jersey, a French-Canadian undertook the job, and proceeded as follows: Having supplied himself with some glass gallon jars and a quantity of unslacked lime he went in a boat to the place where the man was seen to go down. One of the jars was filled half full of lime, and then filled up with water and tightly corked. It was then dropped into the water and soon after exploded at the bottom of the river with a loud report. After the third trial, each time at a different place, the body rose to the surface and was secured.

## 500 ERRORS CORRECTED.

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### Concise Rules in Grammar, Spelling and Pronunciation.

**T**HERE are several kinds of errors in speaking. The most objectionable of them all are those in which words are employed that are unsuitable to convey the meaning intended. Thus, a person wishing to express his intention of going to a given place says, "I *propose* going," when, in fact, he *purposes* going. The following affords an amusing illustration of this class of error: A venerable matron was speaking of her son, who, she said, was quite stage-struck. "In fact," remarked the old lady, "he is going to a *premature* performance this evening!" Considering that most *amateur* performances are *premature*, it cannot be said that this word was altogether misapplied; though, evidently, the maternal intention was to convey quite another meaning.

Other errors arise from the substitution of sounds similar to the words which should be employed; that is, spurious words instead of genuine ones. Thus, some people say "*renumerative*," when they mean "*remunerative*." A nurse, recommending her mistress to have a *perambulator* for her child, advised her to purchase a *preampulator*!

Other errors are occasioned by imperfect knowledge of the English grammar: thus, many people say, "Between you and I," instead of "Between you and *me*." And there are numerous other departures from the rules of grammar, which will be pointed out hereafter.

**MISUSE OF THE ADJECTIVE:** "What *beautiful* butter!" "What a *nice* landscape!" They should say "What a *beautiful* landscape!" "What *nice* butter!" Again, errors are frequently occasioned by the following causes:

**MISPRONUNCIATION OF WORDS:** Many persons say *pronunciation* instead of *pronunciation*; others say pro-nun-she-a-shun, instead of pro-nun-ce-a-shun.

**MISDIVISION OF WORDS AND SYLLABLES:** This defect makes the words *an ambassador* sound like a *nambassador*, or an *adder* like a *nadder*.

**IMPERFECT ENUNCIATION**, as when a person says *hebben* for *heaven*, *ebber* for *ever*, *jocholate* for *chocolate*.

To correct these errors by a systematic course of study would involve a closer application than most persons could afford, but the simple and concise rules and hints here given, founded upon usage and the authority of scholars, will be of great assistance to inquirers.



# GRAMMAR, SPELLING AND PRONUNCIATION.

## RULES AND HINTS FOR CORRECT SPEAKING.

*Who* and *whom* are used in relation to persons, and *which* in relation to things. But it was once common to say, "the man *which*." This should now be avoided. It is now usual to say, "Our Father *who* art in heaven," instead of "*which* art in heaven."

*Whose* is, however, sometimes applied to things as well as to persons. We may therefore say, "The country *whose* inhabitants are free."

*Thou* is employed in solemn discourse, and *you* in common language. *I*'s (plural) is also used in serious addresses, and *you* in familiar language.

The uses of the word *it* are various and very perplexing to the uneducated. It is not only used to imply persons, but things, and even ideas, and therefore in speaking or writing, its assistance is constantly required. The perplexity respecting this word arises from the fact that in using it in the construction of a long sentence, sufficient care is not taken to insure that when *it* is employed it really points out or refers to the object intended. For instance, "It was raining when John set out in his cart to go to market, and he was delayed so long that it was over before he arrived." Now what is to be understood by this sentence? Was the rain over? or the market? Ei her or both might be inferred from the construction of the sentence, which, therefore, should be written thus:—"It was raining when John set out in his cart to go to market, and he was delayed so long that the market was over before he arrived."

*Rule*.—After writing a sentence always look through it, and see that wherever the word *it* is employed, it refers to or carries the mind back to the object which it is intended to point out.

The general distinction between *this* and *that* may be thus defined: *this* denotes an object present or near, in time or place; *that* something which is absent.

*These* refers, in the same manner, to present objects, while *those* refers to things that are remote.

*Who* changes, under certain conditions, into *whose* and *whom*; but *that* and *which* always remain the same, with the exception of the possessive case, as noted above.

*That* may be applied to nouns or subjects of all sorts; as, the *girl that* went to school, the *dog that* bit me, the *opinion that* he entertains.

The misuse of these pronouns gives rise to more errors in speaking and writing than any other cause.

When you wish to distinguish between two or more persons, say, "*Which* is the happy man?" not *who*—"Which of those ladies do you admire?"

Instead of "*Whom* do you think him to be?" say, "*Who* do you think him to be?"

*Whom* should I see?

To *whom* do you speak?

*Who* said so?

*Who* gave it to you?

Of *whom* did you procure them?

*Who* was he?

*Who* do men say that I am?

*Self* should never be added to *his*, *their*, *mine*, or *thine*.

*Each* is used to denote *every* individual of a number.

*Every* denotes *all* the individuals of a number.

*Either* and *or* denote an alternative: "I will take *either* road, at your pleasure," "I will take *this or that*."

*Neither* means *not either*; and *nor* means *not the other*.

*Either* is sometimes used for *each*—"Two thieves were crucified, on *either* side one."

"Let *each* esteem others as good as themselves," should be, "Let *each* esteem others as good as *himself*."

"There are bodies *each* of which are so small," should be, "each of which is so small."

Do not use double superlatives, such as *most straightest*, *most highest*, *most finest*.

## GRAMMAR, SPELLING AND PRONUNCIATION.

The term *worser* has gone out of use ; but *lesser* is still retained.

The use of such words as *chiefest*, *extremest*, etc., has become obsolete, because they do not give any superior force to the meanings of the primary words, *chief*, *extreme*, etc.

Such expressions as *more impossible*, *more indispensable*, *more universal*, *more uncontrollable*, *more unlimited*, etc., are objectionable, as they really enfeeble the meaning which it is the object of the speaker or writer to strengthen. For instance, *impossible* gains no strength by rendering it *more impossible*. This class of error is common with persons who say, "A great large house," "A great big animal," "A little small foot," "A tiny little hand."

*Here*, *there* and *where*, originally denoting place, may now, by common consent, be used to denote other meanings ; such as, "There I agree with you," "Where we differ." "We find pain where we expected pleasure," "Here you mistake me."

*Hence*, *whence* and *thence*, denoting departure, etc., may be used without the word *from*. The idea of *from* is included in the word *whence*—therefore it is unnecessary to say "From whence."

*Hither*, *thither*, and *whither*, denoting to a place, have generally been superseded by *here*, *there*, and *where*. But there is no good reason why they should not be employed. If, however, they are used, it is unnecessary to add the word *to*, because that is implied—"Whither are you going?" "Where are y u going?" Each of these sentences is complete. To say, "Where are you going to?" is redundant.

Two negatives destroy each other, and produce an affirmative. "Nor did he not observe them," conveys the idea that he *did* observe them.

But negative assertions are allowable. "His manners are not impolite," which implies that his manners are in some degree marked by politeness.

Instead of "Let you and I," say "Let you and me."

Instead of "I am not so tall as him," say "I am not so tall as he."

When asked "Who is there?" do not answer "Me," but "I."

Instead of "For you and I," say "For you and me."

Instead of "Says I," say, "I said."

Instead of "You are taller than me," say "You are taller than I."

Instead of "I ain't," or "I arn't," say "I am not."

Instead of "Whether I be present or no," say "Whether I be present or not."

For "Not that I know on," say "Not that I know."

Instead of "Was I to do so," say "Were I to do so."

Instead of "I would do the same if I was him," say "I would do the same if I were he."

Instead of "I had as lief go myself," say "I would as soon go myself," or "I would rather."

It is better to say "Six weeks ago," than "Six weeks back."

It is better to say "Since which time," than "Since when."

It is better to say "I repeated it," than "I said so over again."

Instead of "He was too young to have suffered much," say "He was too young to suffer much."

Instead of "Less friends," say "Fewer friends." Less refers to quantity.

Instead of "A quantity of people," say "A number of people."

Instead of "He and they we know," say "Him and them."

Instead of "As far as I can see," say "So far as I can see."

Instead of "A new pair of gloves," say "A pair of new gloves."

Instead of "I hope you'll think nothing on it," say "I hope you'll think nothing of it."

Instead of "Restore it back to me," say "Restore it to me."

Instead of "I suspect the veracity of his story," say "I doubt the truth of his story."

Instead of "I seldom or ever see him," say "I seldom see him."

Instead of "I expected to have found him," say "I expected to find him."

Instead of "Who learns you music?" say "Who teaches you music?"

Instead of "I never sing whenever I can help it," say "I never sing when I can help it."

Instead of "Before I do that I must first ask leave," say "Before I do that I must ask leave."

## GRAMMAR, SPELLING AND PRONUNCIATION.

Instead of saying "The *observation* of the rule," say "The observance of the rule."

Instead of "A man *of* eighty years of age," say "A man eighty years old."

Instead of "Here *lays* his honored head," say "Here lies his honored head."

Instead of "He died from *negligence*," say "He died through neglect," or "in consequence of neglect."

Instead of "Apples are plenty," say "Apples are plentiful."

Instead of "The *latter end* of the year," say "The end, or the close, of the year."

Instead of "The *then* government," say "The government of that age, or century, or year, or time."

Instead of "A *couple* of chairs," say "Two chairs."

Instead of "They are *united together* in the bonds of matrimony," say "They are united in matrimony," or "They are married."

Instead of "We travel *slow*," say "We travel slowly."

Instead of "He plunged *down* into the river," say "He plunged into the river."

Instead of "He jumped *from off* of the scaffolding," say "He jumped off the scaffolding."

Instead of "He came the last *of all*," say "He came the last."

Instead of "*universal*," with reference to things that have any limit, say "general;" "generally approved," instead of "universally approved;" "generally beloved," instead of "universally beloved."

Instead of "They ruined *one another*," say "They ruined each other."

Instead of "If *in case* I succeed," say "If I succeed."

Instead of "A *large enough* room," say "A room large enough."

Instead of "I am slight in comparison *to you*," say "I am slight in comparison with you."

Instead of "I went *for* to see him," say "I went to see him."

Instead of "The cake is all *eat up*," say "The cake is all eaten."

Instead of "Handsome is *as* handsome does," say "Handsome is who handsome does."

Instead of "The book fell *on* the floor," say "The book fell to the floor."

Instead of "His opinions are *approved of* by all," say "His opinions are approved by all."

Instead of "I will add *one more* argument," say "I will add one argument more," or "another argument."

Instead of "A sad curse is war," say "War is a sad curse."

Instead of "He stands *six foot* high," say "He measures six feet," or "His height is six feet."

Instead of "I go *every now and then*," say "I go sometimes or often."

Instead of "Who finds him in clothes," say "Who provides him with clothes."

Say "The first two," and the last two," instead of "the *two first*," "the two last."

Instead of "His health was *drank with enthusiasm*," say "His health was drunk enthusiastically."

Instead of "*Except* I am prevented," say "Unless I am prevented."

Instead of "In its *primary sense*," say "In its primitive sense."

Instead of "It grieves me to *see* you," say "I am grieved to see you."

Instead of "Give me *them* papers," say "Give me those papers."

Instead of "*Those* papers I hold in my hand," say "These papers I hold in my hand."

Instead of "I could scarcely imagine but *what*," say "I could scarcely imagine but that."

Instead of "He was a man *notorious* for his benevolence," say "He was noted for his benevolence."

Instead of "She was a woman *celebrated* for her crimes," say "She was notorious on account of her crimes."

Instead of "What may your name be?" say "What is your name?"

Instead of "I lifted *it up*," say "I lifted it."

Instead of "It is *equally of the same* value," say "It is of the same value," or "equal value."

Instead of "I knew it *previours* to your telling me," say "I knew it previously to telling me."

## GRAMMAR, SPELLING AND PRONUNCIATION.

Instead of "You *was* out when I called," say "You were out when I called."

Instead of "I thought I should *have won* this game," say "I thought I should win this game."

Instead of "This much is certain," say "Thus much is certain," or, "So much is certain."

Instead of "He went away *as it may be* yesterday week," say "He went away yesterday week."

Instead of "He came *the Saturday as it may be before the Monday*," specify the Monday on which he came

Instead of "Put your watch *in* your pocket," say "Put your watch into your pocket"

Instead of "He has *got* riches," say "He has riches."

Instead of "Will you *set* down?" say "Will you sit down?"

Instead of "No *thankee*," say "No, thank you"

Instead of "I cannot do it without *farther* means," say "I cannot do it without further means."

Instead of "No sooner *but*," or "No other *but*," say "than."

Instead of "No*bod*y*else* but her," say "Nob*o*dy but her"

Instead of "He fell *down* from the balloon," say "He fell from the balloon."

Instead of "He rose *up* from the ground," say "He rose from the ground."

Instead of "These kind of oranges *are* not good," say "This kind of oranges is not good."

Instead of "Somehow or *another*," say "Somehow or other."

Instead of "Will I give you some more tea?" say "Shall I give you some more tea?"

Instead of "Oh dear, what *will* I do?" say "Oh dear, what shall I do?"

Instead of "I think *indifferent* of it," say "I think indifferently of it."

Instead of "I will send it *conformable* to your orders," say "I will send it conformably to your orders."

Instead of "To be *given away gratis*," say "To be given away."

Instead of "Will you enter in?" say "Will you enter?"

Instead of "This three days or more," say "These three days or more."

Instead of "He is a *bad grammarian*," say "He is not a grammarian"

Instead of "We *accuse him for*," say "We accuse him of."

Instead of "We *acquit him from*," say "We acquit him of."

Instead of "I am averse *from* that," say "I am averse to that."

Instead of "I confide *on* you," say "I confide in you."

Instead of "As soon *as ever*," say "As soon as"

Instead of "The *very best*," or "The *very worst*," say "The best or the worst."

Avoid such phrases as "No great shakes," "Nothing to boast of," "Down in my boots," "Suffering from the blues." All such sentences indicate vulgarity.

Instead of "No one *hasn't* called," say "No one has called"

Instead of "You have a *right* to pay me," say "It is right that you should pay me."

Instead of "I am going *over* the bridge," say "I am going *across* the bridge."

Instead of "I *should just* think I could," say "I think I can."

Instead of "There has been a *good deal*," say "There has been much"

Instead of saying "The effort you are making *for* meeting the bill," say "The effort you are making to meet the bill."

To say "Do not give him *no more* of your money," is equivalent to saying "Give him some of your money." Say "Do not give him *any* of your money."

Instead of saying "They are not what nature *designeu* them," say "They are not what nature designed them to be."

Instead of saying "I had not the pleasure of hearing his sentiments when I wrote that letter," say "I had not the pleasure of having heard," etc.

Instead of "The quality of the apples *were* good," say "The quality of the apples was good."

Instead of "The want of learning, courage and energy *are* more visible," say, "Is more visible."

Instead of "We die *for* want," say "We die of want."

Instead of "He died *by* fever," say "He died of fever."

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- Instead of "I *enjoy* bad health," say "My health is not good."  
Instead of "Either of the three," say "Any one of the three."  
Instead of "Better *nor* that," say "Better than that."  
Instead of "We often think *on* you," say "We often think of you."  
Instead of "Mine is so good as yours," say "Mine is as good as yours"  
Instead of "This town is not as large as we thought," say "This town is not so large as we thought."  
Instead of "Because why?" say "Why?"  
Instead of "That *there* boy," say "That boy."  
Instead of "That horse is not *much* worth," say "The horse is not worth much."  
Instead of "The *subject-matter* of debate," say "The subject of debate."  
Instead of saying "When he *was* come back," say "When he had come back."  
Instead of saying "His health has been *shook*," say "His health has been shaken."  
Instead of "It was *spoke* in my presence," say "It was spoken in my presence."  
Instead of "Very right," or "Very wrong," say "Right," or "Wrong."  
Instead of "The *mortgageor* paid him the money," say "The mortgagee paid him the money." The mortgagee lends; the mortgageor borrows.  
Instead of "I *took you to be* another person," say "I mistook you for another person."  
Instead of "On *either* side of the river," say "On each side of the river."  
Instead of "I *here's* fifty," say "There are fifty."  
Instead of "The *best* of the two," say "The better of the two."  
Instead of "My clothes have *become too small* for me," say "I have grown too stout for my clothes."  
Instead of "Two *spoonsful* of physic," say "Two spoonfuls of physic"  
Instead of "She said, says she," say "She said."  
Avoid such phrases as "I said, says I," "Thinks I to myself," etc.  
Instead of "I don't think so," say "I think not."  
Instead of "He was in *eminent* danger," say "He was in *imminent* danger."  
Instead of "The weather is *hot*," say "The weather is very warm."  
Instead of "I *sweat*," say "I perspire."  
Instead of "I *only* want two dollars," say "I want only two dollars."  
Instead of "Whatsomever," say "Whatever," or "Whatsoever."  
Avoid such exclamations as "God bless me!" "God deliver me!" "Py God!" "By Gosh!" "My Lord!" "Upon my soul," etc., which are vulgar on the one hand, and savor of impiety on the other, for—"Thou shalt not take the name of the Lord thy God in vain."

## PRONUNCIATION.

Accent is a particular stress or force of the voice upon certain syllables or words. This mark ' in printing denotes the syllable upon which the stress or force of the voice should be placed.

A word may have more than one accent. Take as an instance *aspiration*. In uttering this word we give a marked emphasis of the voice upon the first and third syllables, and therefore those syllables are said to be accented. The first of these accents is less distinguishable than the second, upon which we dwell longer, therefore the second accent in point of order is called the primary, or chief accent of the word.

When the full accent falls on a vowel, that vowel should have a long sound, as in *vo'cal*; but when it falls on or after a consonant, the preceding vowel has a short sound, as in *hab'it*.

To obtain a good knowledge of pronunciation, it is advisable for the reader to listen to the examples given by good speakers, and by educated persons. We learn the pronunciation of words, to a great extent, by *imitation*, just as birds acquire the notes of other birds which may be near them.

But it will be very important to bear in mind that there are many words having a double meaning or application, and that the difference of meaning is indicated by the difference of the accent. Among these words, *nouns* are distinguished from

# GRAMMAR, SPELLING AND PRONUNCIATION.

*verbs* by this means: *nouns* are mostly accented on the first syllable, and *verbs* on the last.

Noun signifies name; *nouns* are the names of persons and things, as well as of things not material and palpable, but of which we have a conception and knowledge, such as *courage*, *firmness*, *goodness*, *strength*; and *verbs* express *actions*, *movements*, &c. If the word used signifies that anything has been done, or is being done, or is, or is to be done, then that word is a *verb*.

Thus when we say that anything is "an in'sult," that word is a *noun*, and is accented on the first syllable; but when we say he did it "to insult' another person," the word insult' implies *acting*, and becomes a *verb*, and should be accented on the last syllable.

A list of nearly all the words that are liable to similar variation is given here. It will be noticed that those in the first column, having the accent on the first syllable, are mostly nouns; and that those in the second column, which have the accent on the second and final syllable, are mostly verbs:—

<i>Noun, &amp;c.</i>	<i>Verb, &amp;c.</i>	<i>Noun, &amp;c.</i>	<i>Verb, &amp;c.</i>	<i>Noun, &amp;c.</i>	<i>Verb, &amp;c.</i>
Ab'ject	abject'	Con'trast	contrast'.	In'lay	inlay'
Ab'sent	absent'	Con'verse	converse'	In'sult	insult'
Ab'stract	abstract'	Con'vert	convert'	Ob'ject	object'
Ac'cent	accent'	Con'vict	convict'	Out'leap	outleap'
Affix	affix'	Con'voy	convoy'	Per'fect	perfect'
As'pect	aspect'	De'crease	decrease'	Per'fume	perfume'
At'tribute	attribute'	Des'cant	descant'	Per'mit	permit'
Aug'ment	augment'	Des'ert	desert'	Pre'fix	prefix'
Au'gust	august'	De'tail	detail'	Pre'mise	premise'
Bom'bard	bombard'	Di'gest	digest'	Pre'sage	presage'
Col'league	colleague'	Dis'cord	discord'	Pres'ent	present'
Col'lect	collect'	Dis'count	discount'	Prod'uce	produce'
Com'ment	comment'	Efflux	efflux'	Proj'ect	project'
Com'pact	compact'	Es'cort	escort'	Prot'est	protest'
Com'plot	complot'	Es'say	essay'	Reb'el	rebel'
Com'port	comport'	Ex'ile	exile'	Rec'ord	record'
Com'pound	compound'	Ex'port	export'	Ref'use	refuse'
Com'press	compress'	Ex'tract	extract'	Re'tail	retail'
Con'cert	concert'	Fer'ment	ferment'	Sub'ject	subject'
Con'crete	concrete'	Fore'cast	forecast'	Su'pine	supine'
Con'duct	conduct'	Fore'taste	foretaste'	Sur'vey	survey'
Con'fine	confine'	Fre'quent	frequent'	Tor'ment	torment'
Con'flict	conflict'	Im'part	impart'	Tra'ject	traject'
Con'serve	conserve'	Im'port	import'	Trans'fer	transfer'
Con'sort	consort'	Im'press	impress'	Trans'port	transport'
Con'test	contest'	Im'print	imprint'	Un'dress	undress'
Con'text	context'	In'cense	incense'	Up'cast	upcast'
Con'tract	contract'	In'crease	increase'	Up'start	upstart'

Cement' is an exception to the above rule, and should always be accented on the last syllable. So also the word consols'.

## RULES OF PRONUNCIATION.

\* C before *a*, *o*, and *u*, and in some other situations, is a close articulation, like *k*. Before *e*, *i*, and *y*, *c* is precisely equivalent to *s* in *same*, *this*; as in *cedar*, *civil*, *cypress*, *capacity*.

E final indicates that the preceding vowel is long; as in *hate*, *mete*, *sire*, *robe*, *lyre*, *abate*, *recede*, *invite*, *remote*, *intrude*.

E final indicates that *c* preceding has the sound of *s*; as in *lace*, *lance*; and that *g* preceding has the sound of *j*, as in *charge*, *page*, *challenge*.

E final in proper English words, never forms a syllable, and in the most used words, in the terminating unaccented syllable it is silent. Thus, *motive*, *genuine*, *examine*, *granite*, are pronounced *motiv*, *genuin*, *examin*, *granit*.

E final, in a few words of foreign origin, forms a syllable; as *syncope*, *simile*.

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E final is silent after *l* in the following terminations,—*ble, cle, dle, fle, gle, kle, ple, tle, zle*; as in *able, manacle, cradle, ruffle, mangle, wrinkle, supple, rattle, puzzle*, which are pronounced *ab'l, mana'cl, cra'dl, ruf'fl, man'gl, wrin'kl, sup'pl, puz'z'l*.  
E is usually silent in the termination *en*, as in *token, broken*; pronounced *tokn, brokn*.

OUS, in the termination of adjectives and their derivatives, is pronounced *us*; as in *gracious, pious, pompously*.

CE, CI, TI, before a vowel, have the sound of *sh*; as in *cetaceous, gracious, motion, partial, ingratiolate*; pronounced *cetashus, grazhus, moshun, parshal, ingrashiate*.

SI, after an accented vowel, is pronounced like *zh*; as in *Ephesian, confusion*; pronounced *Epheshan, confuzhon*.

When CI or TI precede similar combinations, as in *pronunciation, negotiation*, they should be pronounced *ce* instead of *she*, to prevent a repetition of the latter syllable; as *pronunceashon* instead of *promunshashon*.

GH, b th in the middle and at the end of words is silent; as in *caught, bought, fright, night, sigh*; pronounced *caut, baut, frite, ni, si*. In the following exceptions, however, *gh* are pronounced as *f*:—*cough, chough, clough, enough, laugh, rough, slough, lough, trough*.

When WH begins a word, the aspirate *h* precedes *w* in pronunciation: as in *what, whiff, whale*; pronounced *hwat, hwiff, hwale*, *w* having precisely the sound of *oo*, French *ou*. In the following words *w* is silent:—*who, whom, whose, whoop, whole*.

H after *r* has no sound or use; as in *rheum, rhyme*; pronounced *reum, ryme*.

H should be sounded in the middle of words; as in *forehead, abhor, behold, exhaust, inhabit, unhorse*.

H should always be sounded except in the following words:—*heir, herb, honest, honour, hospital, hostler, hour, humour, and humble*, and all their derivatives,—such as humorously, derived from *humour*.

K and G are silent before *n*; as *know, gnaw*; pronounced *no, naw*.

W before *r* is silent; as in *wring, wreath*; pronounced *ring, reath*.

B after *m* is silent; as in *dumb, numb*; pronounced *dum, num*.

L before *k* is silent as in *balk, walk, talk*; pronounced *bauk, wauk, tauk*.

PH has the sound of *f*; as in *philosophy*; pronounced *filosofy*.

NG has two sounds, one as in *singer*, the other as in *finger*.

N after *m*, and closing a syllable, is silent; as in *hymn, condemn*.

P before *s* and *t* is mute; as in *psalm, pseudo, ptarmigan*; pronounced *sarm, tardo, turmigan*.

R has two sounds, one strong and vibrating, as at the beginning of words and syllables, such as *ribbion, reckon, error*; the other is at the terminations of the words, or when succeeded by a consonant, as *former, morn*.

There are other rules of pronunciation affecting the combinations of vowels, etc.; but as they are more difficult to describe, and as they do not relate to errors which are commonly prevalent, it will suffice to give examples of them in the following list of words. When a syllable in any word in this list is printed in italics, accent of stress of voice should be laid on that syllable.

### WORDS OFTEN MISPRONOUNCED.

Again, usually pronounced *a-gen*, not as spelled.

Alien, *a-li-en*, not *ale-yen*.

Antipodes, an *tip-o-dees*.

Apostle, as *a-pos'tl*, without the *t*.

Arch, *artch* in compounds of our own language, as in *archbishop, archduke*; but *ark* in words derived from the Greek, as *archaic, ar-ka-ik*; *archæology*, *ar-ke-ol-o-gy*; *archangel*, *ark-ain-gel*; *archetype*, *ar-ke-type*; *archiepis-*

*copal*, *ar-ke-e-pis-co-pal*; *archipelago*, *ar-ke-pel-a-go*; *ar-chives*, *ar-kivz*, etc.

Asia, *a-sha*.

Asparagus as *spe'led*, not *asparagras*.

Aunt, *ant*, not *awnt*.

Awkward, *awk-wurd*, not *awk-urd*.

Bade, *bad*.

Because, *be-caus*, not *be-cos*.

Been, *bin*.

Beloved, as a verb, *be-luvd*; as an adjective, *be-luv-ed*. Blessed, cursed,

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etc., are subject to the same rule.  
 Beneath, with the *th* in breath, not with the *th* in breathe.  
 Biog'raphy, as spelled, not beography.  
 Caprice, capreece.  
 Catch, as spelled, not ketch.  
 Chaos, *ka-oss*.  
 Charlatan, *shar-latan*.  
 Chasm, *kazm*.  
 Chasten, chasn.  
 Chivalry, *shiv alry*.  
 Chemistry, *kem'-is-try*.  
 Choir, *kwire*.  
 Combat, *kum-bat*.  
 Conduit, *kun-dit*.  
 Corps, *kor*: the plural corps is pronounced *korz*.  
 Covetous, *cuv-e-tus*, not *cuv-e-chus*.  
 Courteous, *curt-yus*.  
 Courtesy (politeness), *cur-te-sey*.  
 Courtesy (a lowering of the body), *curt-sey*.  
 Cresses, as spelled, not *cree-ses*.  
 Cu'riosity, *tu-re-as-e-ty*, not *curasity*.  
 Cushion, *coosh-un*, not *coosh-in*.  
 Daunt, *dawnt*, not *dant* or *darnt*.  
 Design and desist have the sound of *s*, not of *z*.  
 Desire should have the sound of *s*.  
 Dew, *due*, not *doo*.  
 Diamond, as spelled, not *di-mond*.  
 Diploma, *de-plo-ma*, not *aip-lo-ma*.  
 Diplomacy, *de-plo-ma-cy*, not *dip-lo-ma-cy*.  
 Divers (several), *di-verz*; but diverse (different), *di-verse*.  
 Drought, *drowt*, not *drawt*.  
 Duke, as spelled, not *dook*.  
 Dynasty, *dyn-as-te*, not *dy-nas-ty*.  
 Edict, *e-dickt*, not *ed-ickt*.  
 E'en, and e'er, *een* and *air*.  
 Egotism, *eg-o-tism*, not *e-go-tism*.  
 Either, *e-ther*.  
 Engine, *en-jin*, not *in-jin*.  
 Epistle, without the *t*.  
 Epitome, *e-pit-o-me*.  
 Epoch, *e-pock*, not *ep-ock*.  
 Equinox, *e-qui-rox*, not *eq-kwe-nox*.  
 Europe, *U-rope*, not *U-rup*.  
 Euro-pe-an, not *Eu-ro-pean*.  
 Every, *ev-er-y*, not *eu-ry*.  
 Executor, *egz-ec-utor*, not with the sound of *x*.  
 Extraordinary, *ex-tror-di-ner-i*, not *ex-trordinary*, nor *extranary*.  
 February, as spelled, not *Febuary*.  
 Finance, *fe-nance*, not *finance*.  
 Foundling as spelled, not *fond ling*.  
 Garden, *gar-dn*, not *gar-den*, nor *gard-ing*.  
 Gauntlet, *gawnt-let*, not *gant-let*.

Geography, as spelled, not *jography*, or *gehography*.  
 Geometry, as spelled, not *jom-etry*.  
 Haunt, *hawnt*, not *hant*.  
 Height, *hite*, not *highth*.  
 Heinous, *kay-nus*, not *hee-nus*.  
 Horizon, *ho-ri-zn*, not *hor-i-son*.  
 Hymeneal, *hy-men-e-al*, not *hy-menal*.  
 Instead, *in-sted*, not *instid*.  
 Isolate, *i-so-late*, not *is-olate*, nor *is-olate*.  
 Jalap, *jai-ap*, not *jolup*.  
 January, as spelled, not *Jenuary* nor *Jane-wary*.  
 Leave, as spelled, not *leaf*.  
 Legend, *lej-end*, not *le-gend*.  
 Many, *men-ney*, not *man-ny*.  
 Marchioness, *mar-shun-ess*, not as spelled.  
 Massacre, *mas-sa-ker*.  
 Mattress, as spelled, not *mat-trass*.  
 Matron, *ma-trun*, not *mat-ron*.  
 Medicine, *med-e-cin*, not *med-cin*.  
 Minute (sixty seconds), *min-it*.  
 Minute (small), *mi-nute*.  
 Mischievous, *mis-chiv-us*, not *mis-chev-us*.  
 Ne'er, for never, *nare*.  
 New, *nu*, not *noo*.  
 Oblige, as spelled, not *obleege*.  
 Oblique, *ob-leek*, not *o-blike*.  
 Odorous, *o-der-us*, not *od-ur-us*.  
 Of, *ov*, except when compounded with there, here and where, which should be pronounced *here-of*, *there-of*, and *where-of*.  
 Off, as spelt, not *awf*.  
 Organization, *or-gan-i-za-shun*.  
 Ostrich, *os-trich*, not *os-tridge*.  
 Pageant, *paj-ent*, not *pa-jant*.  
 Parent, *pare-ent*, not *par-ent*.  
 Partisan, *par-te-zan*, not *par-te-zan*, nor *par-ti-zan*.  
 Physiognomy, as *fiz-i-og-nomy*, not *physi-onomy*.  
 Pincers, *pin-cerz*, not *pinch-erz*.  
 Plaintiff, as spelled, not *plantiff*.  
 Precedent (an example), *pres-e-dent*; *prece-dent* (going before in point of time, previous, former) is the pronunciation of the adjective.  
 Prologue, *pro-log*, not *prol-og*.  
 Radish, as spelled, not *red-sh*.  
 Raillery, *rail-er-y*, or *ral-er-y*, not as spelled.  
 Rather, *ra-ther*, not *ray-ther*.  
 Resort, *re-sort*.  
 Resound, *re-sound*.  
 Respite, *res-pit*, not as spelled.  
 Rout (a party; and so rout) should be pronounced *rowt*. Route (a road), root or rowt.



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- Saunter, *sawn*-ter, not *sarn*-ter or *san*-ter.  
 Sausage, *saw*-sage, not *sos*-sidge, *sas*-sage.  
 Schedule, *shed*-ule, not *shed*-ule.  
 Seamstress is pronounced *seem*-stress, but semp-stress, as the word is sometimes spelt, in pronounced *sem*-stress.  
 Shire, as spelled, when uttered as a single word, but shortened into shir in composition.  
 Shone, shon, not shun, nor as spelled.  
 Soldier, *sole*-jer.  
 Solicism, *sol*-e-cizm, not *so*-le-cizm.  
 Soot, as spelled, not sut.  
 Sovereign, *sov*-er-in, not *su*-er-in.  
 Specious, *spe*-shus, not *spesh*-us.  
 Stomacher, *stum*-a-cher.  
 Stone (weight), as spelled, not stun.  
 Synod, *sin*-od, not *sy*-nod.  
 Tenure, *ten*-ure, not *te*-nure.  
 Tenet, *ten*-et, not *te*-net.  
 Than, as spelled, not thun.  
 Tremor, *trem*-ur, not *tre*-mor.  
 Twelfth should have the th sounded.  
 Umbrella, as spelled, not um-ber-el-la.  
 Vase, vaiz or varz, not vawze.  
 Was, woz, not wuz.  
 Weary, *weer*-i, not wary.  
 Were, wer, not ware.  
 Wrath, rawth, not rath : as an adjective it is spelled wroth, and pronounced with the vowel sound shorter, as in wrathful, etc.  
 Yacht, yot, not yat.  
 Zenith, *zen*-ith, not *ze*-nith.  
 Zodiac, zo-de-ak.  
 Zoology should have both *o*'s sounded, as zo-ol-o-gy, not zoo-lo-gy.

*Note.*—The tendency of all good elocutionists is to pronounce as nearly in accordance with the spelling as possible.

### Pronounce—

- ace not iss, as furnace, not furniss.
- age, not idge, as cabbage, courage, postage, village.
- ain, ane, not in, as certain, certane, not certin.
- ate, not it, as moderate, not moderit.
- ect, not ec, as aspect, not aspec ; subject, not subjec.
- ed, not id, or ud, as wicked, not wickid, or wickud.
- el, not l, model, not modl ; novel, not novl.
- en, not n, as sudden, not suddn.—Burden, burthen, garden, lengthen, seven, strengthen, often, and a few others, have the *e* silent.
- ence, not unce, as influence, not influ-unce.
- es, not is, as pleases, not pleasis.
- ile should be pronounced il, as fertil, not fertile, in all words except chamomile (*cam*), exile, gentile, infantile, reconcile, and senile, which should be pronounced ile.
- in, not n, as Latin, not Latn.
- nd, not n, as husband, not husban ; thousand, not thousan.
- ness, not niss, as carefulness, not carefulniss.
- ng, not n, as singing, not singin ; speaking, not speakin.
- ngth, not nth, as strength, not strenth.
- son, the *o* should be silent ; as in treason, tre-zn, not tre-son.
- tal, not tle, as capital, not capitle ; metal, not mettle ; mortal, not mort'e ; periodical, not periodicle.
- xt, not x, as next, not nex.

### WHAT'S IN A NAME?

An Englishman whose name was Wemyss  
 Went crazy at last, so it semys,  
 Because the people would not  
 Understand that they ought  
 To call him not Weemis, but Weems.

Another whose last name was Knollys  
 Tried vainly to vote at the pollis ;  
 But no ballot he cast  
 Because to the last  
 The clerk couldn't call Knolliss Noles.

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And then a young butcher named Belvoir  
Went and murdered a man with a clevoir  
Because the man couldn't,  
Or possibly wouldn't,  
Pronounce his name properly Beever.

There was an athlete named Strachan  
Who had plenty of sinew and brachan,  
And he'd knock a man down  
With an indignant frown  
If he failed to pronounce his name Strawn.

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### SHORT RULES FOR SPELLING.

Words ending in *e* drop that letter on taking a suffix beginning with a vowel.  
Exceptions—words ending in *ge*, *ce*, or *oe*.

Final *e* of a primitive word is retained on taking a suffix beginning with a consonant. Exceptions—words ending in *dge*, and *truly*, *duly*, etc.

Final *y* of a primitive word, when preceded by a consonant, is generally changed into *i* on the addition of a suffix. Exceptions—retained before *ing* and *ish*, as *plying*. Words ending in *ie* and dropping the *e* by Rule *x*, change the *i* to *y*, as *lying*. Final *y* is sometimes changed to *e*, as *duteous*.

Nouns ending in *y*, preceded by a vowel, form their plural by adding *r*; as *money*, *moneys*. *Y* preceded by a consonant is changed to *ies* in the plural; as *bounty*, *bounties*.

Final *y* of a primitive word, preceded by a vowel, should not be changed into *i* before a suffix; as, *joyless*.

In words containing *ei* or *ie*, *ei* is used after the sound of *s*; as *ceiling*, *seize*, except in *siege* and a few words ending in *cier*. *Inveigle*, *neither*, *leisure* and *weird* also have *ei*. In other cases it is used, as in *believe*, *achieve*.

Words ending in *ceous* or *clous*, when relating to matter, end in *ceous*; all others in *clous*.

Words of one syllable, ending in a consonant, with a single vowel before it, double the consonants in derivatives; as, *ship*, *shipping*, etc. But if ending in a consonant with a double vowel before it, they do not double the consonant in derivatives; as *troop*, *trooper*, etc.

Words of more than one syllable, ending in a consonant preceded by a single vowel, and accented on the last syllable, double that consonant in derivatives; as *commit*, *committed*; but except *chagrin*, *chagrined*.

All words of one syllable ending in *l*, with a single vowel before it, have *ll* at the close; as *mill*, *sell*.

All words of one syllable ending in *l*, with a double vowel before it, have only one *l* at the close; as *mail*, *sail*.

The words *foretell*, *distill*, *instill* and *fulfill*, retain the double *ll* of their primitives. Derivatives of *dull*, *skill*, *will* and *full* also retain the double *ll* when the accent falls on these words; as *dullness*, *skillful*, *willful*, *fullness*.

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### PUNCTUATION.

A period (.) after every declarative and every imperative sentence; as, *It is true.*  
Do right.

A period after every abbreviation; as, *Dr.*, *Mr.*, *Capt.*

An interrogation point (?) after every question.

The exclamation point (!) after exclamations; as, *Alas!* *Oh, how lovely!*

Quotation marks (" ") enclose quoted expressions; as, *Socrates said: "I believe the soul is immortal."*

A colon (:) is used between parts of a sentence that are subdivided by semicolons.

A colon is used before a quotation, enumeration, or observation, that is intro-

## PUNCTUATION.

duced by *as follows*, *the following*, or any similar expression; as, Send me the following: 10 doz. "Armstrong's Treasury," 25 Schulte's Manual, etc.

A semicolon (;) between parts that are subdivided by commas.

The semicolon is used also between clauses or members that are disconnected in sense; as, Man grows old; he passes away; all is uncertain. When *as, namely*, that is, is used to introduce an example or enumeration, a semicolon is put before it and a comma after it; as, The night was cold; that is, for the time of year.

A comma (,) is used to set off co-ordinate clauses, and subordinate clauses not restrictive; as, Good deeds are never lost, though sometimes forgotten.

A comma is used to set off transposed phrases and clauses; as, "When the wicked entice thee, consent thou not."

A comma is used to set off interposed words, phrases and clauses; as, Let us, if we can, make others happy.

A comma is used between similar or repeated words or phrases; as, The sky, the water, the trees, were illumined with sunlight.

A comma is used to mark an ellipsis, or the omission of a verb or other important word.

A comma is used to set off a short quotation informally introduced; as, Who said, "The good die young"?

A comma is used whenever necessary to prevent ambiguity.

The marks of parenthesis ( ) are used to enclose an interpolation where such interpolation is by the writer or speaker of the sentence in which it occurs. Interpolations by an editor or by anyone other than the author of the sentence should be inclosed in brackets, [ ].

Dashes ( — ) may be used to set off a parenthetical expression, also to denote an interruption or a sudden change of thought or a significant pause.

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## THE USE OF CAPITALS.

1. Every entire sentence should begin with a capital.
2. Proper names, and adjectives derived from these, should begin with a capital.
3. All appellations of the Deity should begin with a capital.
4. Official and honorary titles begin with a capital.
5. Every line of poetry should begin with a capital.
6. Titles of books and the heads of their chapters and divisions are printed in capitals.
7. The pronoun I, and the exclamation, O, are always capitals.
8. The days of the week, and the months of the year, begin with capitals.
9. Every quotation should begin with a capital letter.
10. Names of religious denominations begin with capitals.
11. In preparing accounts, each item should begin with a capital.
12. Any word of special importance may begin with a capital.

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## HOW TO WRITE A LETTER.

A business letter should be written clearly, explicitly, and concisely.

Figures should be written out, except dates; sums of money should be both in writing and figures.

Copies should be kept of all business letters.

When you receive a letter containing money it should be immediately counted and the amount marked on the top margin.

Letters to a stranger about one's own personal affairs, requesting answer, should always inclose a stamp.

Short sentences are preferable to long ones.

Letters requiring an answer should have prompt attention.

Never write a letter while under excitement or when in an unpleasant humor.

Never write an anonymous letter.

Do not fill your letter with repetitions and apologies.

## HOW TO WRITE A LETTER.

**Avoid writing with a pencil.** Use black ink. Blue or violet may be used, but black is better.

In acknowledging receipt of a letter always mention date.

**Paper.** Note, packet or letter size should be used. It is unbusiness-like and very poor taste to use foolscap or mere scraps.

**Paging.** If single sheets are used they should be carefully paged. Business letters should be written on but one side of the sheet.

**Folding.** A letter sheet should be folded from bottom upward. Bring lower edge near the top so as to make the length a trifle shorter than the envelope, then fold twice the other way. The folded sheet should be just slightly smaller than the envelope.

If note sheet, fold twice from bottom upward. If envelope is nearly square, single fold of note sheet is sufficient.

**Envelopes,** like the paper, should be white, and of corresponding size and quality. It is poor taste to use colored paper, or anything but black ink.

The postage stamp should be placed at the upper right hand corner.

**Address.** This should be so plainly written that no possible mistake could be made either in name or address. It is unnecessary to add the letters P. O. after the name of the place. When the letter reaches the town it is not likely to go to the court-house or jail. Letters of introduction should bear upon envelope the name and address of the person to whom sent, also the words in the lower left hand corner, "Introducing Mr. —."

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**LUMINOUS PAINT.**—This useful paint may, it is said, be made by the following simple method: Take oyster shells and clean them with warm water; put them into the fire for half an hour; at the end of that time take them out and let them cool. When quite cool pound them fine and take away any gray parts, as they are of no use. Put the powder in a crucible in alternate layers with flour and sulphur. Put on the lid and cement with sand made into a stiff paste with beer. When dry, put over the fire and bake for an hour. Wait until quite cold before opening the lid. The product ought to be white. You must separate all gray parts, as they are not luminous. Make a sifter in the following manner: Take a pot, put a piece of very fine muslin very loosely across it, tie around with a string, put the powder into the top, and rake about until only the coarse powder remains; open the pot and you will find a very small powder; mix it into a thin paint with gum water, as two thin applications are better than one thick one. This will give a paint that will remain luminous far into the night, provided it is exposed to light during the day.

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**TRANSFERRING ENGRAVINGS.**—It is said that engravings may be transferred on white paper as follows: Place the engraving a few seconds over the vapor of iodine. Dip a slip of white paper in a weak solution of starch, and when dry, in a weak solution of oil of vitriol. When again dry, lay a slip upon the engraving and place both for a few minutes under a press. The engraving will be reproduced in all its delicacy and finish. Lithographs and printed matter cannot be so transferred with equal success.

# SYNONYMS AND ANTONYMS.

## A Dictionary of 12,000 Words of Similar and Contrary Meaning.

**N**O TWO words in the English language have exactly the same significance, but to express the precise meaning which one intends to convey, and also to avoid repetitions, it is often desirable to have at hand a Dictionary of Synonyms. Take President Cleveland's famous phrase, "innocuous desuetude." If he had said simply, "harmless disuse," it would have sounded clumsy, whereas the words he used expressed the exact shade of meaning, besides giving the world a new phrase and the newspapers something to talk about.

The following list of **SYNONYMS**, while not exhaustive, is quite comprehensive, and by cross-reference will answer most requirements. The appended **ANTONYMS**, or words of opposite meaning, enclosed in parentheses, will also be found extremely valuable, for one of the strongest figures of speech is *antithesis*, or contrast :

**ABANDON**, leave, forsake, desert, renounce, relinquish, quit, forego, let go, waive. (Keep, cherish.) **Abandoned**, deserted, forsaken, wicked, reprobate, dissolute, profligate, flagitious, corrupt, depraved, vicious. (Cared for, virtuous.) **Abandonment**, leaving, desertion, dereliction, renunciation, defection. **Abasement**, degradation, fall, degeneracy, humiliation, abjection, debasement, servility. (Honor.) **Abash**, bewilder, disconcert, discompose, confound, confuse, shame. (Embolden.) **Abbreviate**, shorten, abridge, condense, contract, curtail, reduce. (Extend.) **Abdicate**, give up, resign, renounce, abandon, forsake, relinquish, quit, forego. **Abet**, help, encourage, instigate, incite, stimulate, aid, assist. (Resist.) **Abettor**, assistant, accessory, accomplice, promoter, instigator, *particeps criminis*, coadjutor, associate, companion, co-operator. (Opponent.) **Abhor**, dislike intensely, view with horror, hate, detest, abominate, loathe, nauseate. (Love.) **Ability**, capability, talent, faculty, capacity, qualification, aptitude, aptness, expertness, skill, efficiency, accomplishment, attainment. (Incompetency.) **Abject**, grovelling, low, mean, base, ignoble, worthless, despicable, vile, servile, contemptible. (Noble.) **Abjure**, recant, forswear, disclaim, recall, revoke, retract, renounce. (Maintain.) **Able**, strong, powerful, muscular, stalwart, vigorous, athletic, robust, brawny, skillful, adroit, competent, efficient, capable, clever, self-qualified, telling, fitted. (Weak.) **Abode**, residence, habitation, dwelling, domicile, home, quarters, lodging. **Abolish**, quash, destroy, revoke, abrogate, annul, cancel, annihilate, extinguish, vitiate, invalidate, nullify. (Establish, enforce.) **Abominable**, hateful, detestable, odious, vile, execrable. (Lovable.) **Abortive**, fruitless, ineffectual, idle, inoperative, vain, futile. (Effectual.) **About**, concerning, regarding, relative to, with regard to, as to, respecting, -with respect to, referring to, around, nearly, approximately. **Abscond**, run off, steal away, decamp, bolt. **Absent**, *a.*, inattentive, abstracted, not attending to, listless, dreamy. (Present.) **Absolute**, entire, complete, unconditional, unqualified, unrestricted, despotic, arbitrary, tyrannous, imperative, authoritative, imperious. (Limited.) **Absorb**, engross, swallow up, engulf, imbibe, consume, merge, fuse. **Absurd**, silly, foolish, preposterous, ridiculous, irrational, unreasonable, nonsensical, inconsistent. (Wise, solemn.) **Abuse**, *v.*, asperse, revile, vilify, reproach, calumniate, defame, slander, scandalize, malign, traduce, disparage, de-

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preciate, ill-use. (Praise, protect.) **Abuse**, *n.*, scurrility, ribaldry, contumely, obloquy, opprobrium, foul, invective, vituperation, ill-usage. (Praise, protection.) **Accede**, assent to, consent, acquiesce, comply with, agree, coincide, concur, approve. (Protest.) **Accelerate**, hasten, hurry, expedite, forward, quicken, despatch. (Retard.) **Accept**, receive, take, admit. (Refuse.) **Acceptable**, agreeable, pleasing, pleasurable, gratifying, welcome. (Displeasing.) **Accident**, casualty, incident, contingency, adventure, chance. **Accommodate**, serve, oblige, adapt, adjust, fit, suit. (Disoblige, impede.) **Accomplice**, confederate, accessory, abettor, coadjutor, assistant, ally, associate, *particeps criminis* (Adversary.) **Accomplish**, do, effect, finish, execute, achieve, complete, perfect, consummate. (Fail.) **Accomplishment**, attainment, qualification, acquirement. (Defect.) **Accord**, grant, allow, admit, concede. (Deny.) **Accost**, salute, address, speak to, stop, greet. **Account**, narrative, description, narration, relation, detail, recital, moneys, reckoning, bill, charge. **Accountable**, punishable, answerable, amenable, responsible, liable. **Accumulate**, bring together, amass, collect, gather. (Scatter, dissipate.) **Accumulation**, collection, store, mass, congeries, concentration. **Accurate**, correct, exact, precise, nice, truthful. (Erroneous, careless.) **Achieve**, do, accomplish, effect, fulfill, execute, gain, win. **Achievement**, feat, exploit, accomplishment, attainment, performance, acquirement, gain. (Failure.) **Acknowledge**, admit, confess, own, avow, grant, recognize, allow, concede. (Deny.) **Acquaint**, inform, enlighten, apprise, make aware, make known, notify, communicate. (Deceive.) **Acquaintance**, familiarity, intimacy, cognizance, fellowship, companionship, knowledge. (Unfamiliarity.) **Acquiesce**, agree, accede, assent, comply, consent, give way, coincide with. (Protest.) **Acquit**, pardon, forgive, discharge, set free, clear, absolve. (Condemn, convict.) **Act**, do, operate, make, perform, play, enact. **Action**, deed, achievement, feat, exploit, accomplishment, battle, engagement, agency, instrumentality. **Active**, lively, sprightly, alert, agile, nimble, brisk, quick, supple, prompt, vigilant, laborious, industrious. (Lazy, passive.) **Actual**, real, positive, genuine, certain. (Fictitious.) **Acute**, shrewd, intelligent, penetrating, piercing, keen. (Dull.) **Adapt**, accommodate, suit, fit, conform. **Addicted**, devoted, wedded, attached, given up to, dedicated. **Addition**, increase, accession, augmentation, reinforcement. (Subtraction, separation.) **Address**, speech, discourse, appeal, oration, tact, skill, ability, dexterity, deportment, demeanor. **Adhesion**, adherence, attachment, fidelity, devotion. (Aloofness.) **Adjacent**, near to, adjoining, contiguous, conterminous, bordering, neighboring. (Distant.) **Adjourn**, defer, prorogue, postpone, delay. **Adjunct**, appendage, appurtenance, appendency, dependency. **Adjust**, set right, fit, accommodate, adapt, arrange, settle, regulate, organize. (Confuse.) **Admirable**, striking, surprising, wonderful, astonishing. (Detestable.) **Admit**, allow, permit, suffer, tolerate. (Deny.) **Advantageous**, beneficial. (Hurtful.) **Affection**, love. (Aversion.) **Affectionate**, fond, kind. (Harsh.) **Agreeable**, pleasant, pleasing, charming. (Disagreeable.) **Alternating**, intermittent. (Continual.) **Ambassador**, envoy, plenipotentiary, minister. **Amend**, improve, correct, better, mend. (Impair.) **Anger**, ire, wrath, indignation, resentment. (Good nature.) **Appropriate**, assume, ascribe, arrogate, usurp. **Argue**, debate, dispute, reason upon. **Arise**, flow, emanate, spring, proceed, rise, issue. **Artful**, disingenuous, sly, tricky, insincere. (Candid.) **Artifice**, trick, stratagem, finesse. **Association**, combination, company, partnership, society. **Attack**, assail, assault, encounter. (Defend.) **Audacity**, boldness, effrontery, hardihood. (Meekness.) **Austere**, rigid, rigorous, severe, stern. (Dissolute.) **Avaricious**, niggardly, miserly, parsimonious. (Generous.) **Aversion**, antipathy, dislike, hatred, repugnance. (Affection.) **Awe**, dread, fear, reverence. (Familiarity.) **Awkward**, clumsy. (Graceful.) **Axiom**, adage, aphorism, apothegm, by-word, maxim, proverb, saying, saw.

**BABBLE**, chatter, prattle, prate. **Bad**, wicked, evil. (Good.) **Baffle**, confound, defeat, disconcert. (Aid, abet.) **Base**, vile, mean. (Noble.) **Battle**, action, combat, engagement. **Bear**, carry, convey, transport. **Bear**, endure, suffer, support. **Beastly**, brutal, sensual, bestial. **Beat**, defeat, overpower, overthrow, rout. **Beautiful**, fine, handsome, pretty. (Homely, ugly.) **Becoming**, decent, fit, seemly, suitable. (Unbecoming.) **Beg**, beseech, crave, entreat, implore, solicit,

## SYNONYMS AND ANTONYMS.

**supplicate.** (Give.) **Behavior**, carriage, conduct, deportment, demeanor. **Belief**, credit, faith, trust. (Doubt.) **Beneficent**, bountiful, generous, liberal, munificent. (Covetous, miserly.) **Benefit**, favor, advantage, kindness, civility. (Injury.) **Benevolence**, beneficence, benignity, humanity, kindness, tenderness. (Malevolence.) **Blame**, censure, condemn, reprove, reproach, upbraid. (Praise.) **Blemish**, flaw, speck, spot, stain. (Ornament.) **Blind**, sightless, heedless. (Far-sighted.) **Blot**, cancel, efface, expunge, erase, obliterate. **Bold**, brave, daring, fearless, intrepid, undaunted. (Timid.) **Border**, brim, brink, edge, margin, rim, verge, boundary, confine, frontier. **Bound**, circumscribe, confine, limit, restrict. **Brave**, dare, defy. **Bravery**, courage, valor. (Cowardice.) **Break**, bruise, crush, pound, squeeze. **Breeze**, blast, gale, gust, hurricane, storm, tempest. **Bright**, clear, radiant, shining. (Dull.) **Brittle**. **Burial**, interment, sepulture. (Resurrection.) **Business**, avocation, employment, engagement, occupation, art, profession, trade. **Bustle**, stir, tumult, fuss. (Quiet.)

**CALAMITY**, disaster, misfortune, mischance, mishap. (Good fortune.) **Calm**, collected, composed, placid, serene. (Stormy, unsettled.) **Capable**, able, competent. (Incompetent.) **Captious**, fretful, cross, peevish, petulant. (Good-natured.) **Care**, anxiety, concern, solicitude, heed, attention. (Heedlessness, negligence.) **Caress**, kiss, embrace. (Spurn, buffet) **Carnage**, butchery, massacre, slaughter. **Cause**, motive, reason. (Effect, consequence.) **Cease**, discontinue, leave off, end. (Continue.) **Censure**, animadvert, criticize. (Praise.) **Certain**, secure, sure. (Doubtful.) **Cessation**, intermission, rest, stop. (Continuance.) **Chance**, fate, fortune. (Design.) **Change**, barter, exchange, substitute. **Changeable**, fickle, inconstant, mutable, variable. (Unchangeable.) **Character**, reputation, repute, standing. **Charm**, captivate, enchant, enrapture, fascinate. **Chastity**, purity, continence, virtue. (Lewdness.) **Cheap**, inexpensive, inferior, common. (Dear.) **Cheerful**, gay, merry, sprightly. (Mournful.) **Chief**, chieftain, head, leader. (Subordinate.) **Circumstance**, fact, incident. **Glass**, degree, order, rank. **Clear**, bright, lucid, vivid. (Opaque.) **Clever**, adroit, dexterous, expert, skillful. (Stupid.) **Clothed**, clad, dressed. (Naked.) **Coarse**, rude, rough, unpolished. (Fine.) **Coax**, cajole, fawn, wheedle. **Cold**, cool, frigid, wintry, unfeeling, stoical. (Warm.) **Color**, dye, stain, tinge. **Colorable**, ostensible, plausible, specious. **Combination**, cabal, conspiracy, plot. **Command**, injunction, order, precept. **Commodity**, goods, merchandise, ware. **Common**, mean, ordinary, vulgar. (Uncommon, extraordinary.) **Compassion**, sympathy, pity, clemency. (Cruelty, severity.) **Compel**, force, oblige, necessitate. (Coax, lead.) **Compensation**, amends, recompense, remuneration, requital, reward. **Compendium**, compend, abridgment. (Enlargement.) **Complain**, lament, murmur, regret, repine. (Rejoice.) **Comply**, accede, conform, submit, yield. (Refuse.) **Compound**, complex. (Simple.) **Comprehend**, comprise, include, embrace, grasp, understand, perceive. (Exclude, mistake.) **Comprise**, comprehend, contain, embrace, include. **Conceal**, hide, secrete. (Uncover.) **Conceive**, comprehend, understand. **Conclusion**, inference, deduction. **Condemn**, censure, blame, disapprove. (Justify, exonerate.) **Conduct**, direct, guide, lead, govern, regulate, manage. **Confirm**, corroborate, approve, attest. (Contradict.) **Conflict**, combat, contest, contention, struggle. (Peace, quiet.) **Confute**, disprove, refute, opugn. (Approve.) **Conquer**, overcome, subdue, surmount, vanquish. (Defeat.) **Consequence**, effect, event, issue, result. (Cause.) **Consider**, reflect, ponder, weigh. **Consistent**, constant, compatible. (Inconsistent.) **Console**, comfort, solace. (Harrow, worry.) **Constancy**, firmness, stability, steadiness. (Fickleness.) **Contaminate**, corrupt, defile, pollute, taint. **Contemn**, despise, disdain, scorn. (Esteem.) **Contemplate**, meditate, muse. **Contemptible**, despicable, paltry, pitiful, vile, mean. (Noble.) **Contend**, contest, dispute, strive, struggle, combat. **Continual**, constant, continuous, perpetual, incessant. (Intermittent.) **Continuance**, continuation, duration. (Cessation.) **Continue**, persist, persevere, pursue, prosecute. (Cease.) **Contradict**, deny, gainsay, oppose. (Confirm.) **Cool**, cold, frigid. (Hot.) **Correct**, rectify, reform. **Cost**, charge, expense, price. **Covetousness**, avarice, cupidity. (Beneficence.) **Cowardice**, fear, timidity, pusillanimity. (Courage.) **Crime**, sin, vice, misdemeanor. (Vir-

## SYNONYMS AND ANTONYMS.

tue) **Criminal**, convict, culprit, felon, malefactor. **Crooked**, bent, curved, oblique. (Straight.) **Cruel**, barbarous, brutal, inhuman, savage. (Kind.) **Cultivation**, culture, refinement. **Cursory**, desultory, hasty, slight. (Thorough.) **Custom**, fashion, manner, practice.

**DANGER**, hazard, peril. (Safety.) **Dark**, dismal, opaque, obscure, dim. (Light.) **Deadly**, fatal, destructive, mortal. **Dear**, beloved, precious, costly, expensive. (Despised, cheap.) **Death**, departure, decease, demise. (Life.) **Decay**, decline, consumption. (Growth.) **Deceive**, delude, impose upon, over-reach, gull, dupe, cheat. **Deceit**, cheat, imposition, trick, delusion, guile, beguilement, treachery, sham. (Truthfulness.) **Decide**, determine, settle, adjudicate, terminate, resolve. **Decipher**, read, spell, interpret, solve. **Decision**, determination, conclusion, resolution, firmness. (Vacillation.) **Declamation**, oratory, elocution, harangue, effusion, debate. **Declaration**, avowal, manifestation, statement, profession. **Decrease**, diminish, lessen, wane, decline, retrench, curtail, reduce. (Growth.) **Dedicate**, devote, consecrate, offer, set, apportion. **Deed**, act, action, commission, achievement, instrument, document, muniment. **Deem**, judge, estimate, consider, think, suppose, conceive. **Deep**, profound, subterranean, submerged, designing, abstruse, learned. (Shallow.) **Deface**, mar, spoil, injure, disfigure. (Beautify.) **Default**, lapse, forfeit, omission, absence, want, failure. **Defect**, imperfection, flaw, fault, blemish. (Beauty, improvement.) **Defend**, guard, protect, justify. **Defense**, excuse, plea, vindication, bulwark, rampart. **Defer**, delay, postpone, put off, prorogue, adjourn. (Force, expedite.) **Deficient**, short, wanting, inadequate, scanty, incomplete. (Complete, perfect.) **Defile**, v., pollute, corrupt, sully. (Beautify.) **Define**, fix, settle, determine, limit. **Defray**, meet, liquidate, pay, discharge. **Degree**, grade, extent, measure. **Deliberate**, v., consider, meditate, consult, ponder, debate. **Deliberate**, a., purposed, intentional, designed, determined. (Hasty.) **Delicacy**, nicety, dainty, refinement, tact, softness, modesty. (Boorishness, indelicacy.) **Delicate**, tender, fragile, dainty, refined. (Coarse.) **Delicious**, sweet, palatable. (Nauseous.) **Delight**, enjoyment, pleasure, happiness, transport, ecstasy, gladness, rapture, bliss. (Annoyance.) **Deliver**, liberate, free, rescue, pronounce, give, hand over. (Retain.) **Demonstrate**, prove, show, exhibit, illustrate. **Depart**, leave, quit, decamp, retire, withdraw, vanish. (Remain.) **Deprive**, strip, bereave, despoil, rob, divest. **Depute**, appoint, commission, charge, intrust, delegate, authorize, accredit. **Derision**, scorn, contempt, contumely, disrespect. **Derivation**, origin, source, beginning, cause, etymology, root. **Describe**, delineate, portray, explain, illustrate, define, picture. **Desecrate**, profane, secularize, misuse, abuse, pollute. (Keep holy.) **Deserve**, merit, earn, justify, win. **Design**, n., delineation, sketch, drawing, cunning, artfulness, contrivance. **Desirable**, expedient, advisable, valuable, acceptable, proper, judicious, beneficial, profitable, good. **Desire**, n., longing, affection, craving. **Desist**, cease, stop, discontinue, drop, abstain, forbear. (Continue, persevere.) **Desolate**, bereaved, forlorn, forsaken, deserted, wild, waste, bare, bleak, lonely. (Pleasant, happy.) **Desperate**, wild, daring, audacious, determined, reckless. **Despised**. **Destiny**, fate, decree, doom, end. **Destructive**, detrimental, hurtful, noxious, injurious, deleterious, baleful, baneful, subversive. (Creative, constructive.) **Disuade**, dissuade, dissuade, discourage. (Maintenance.) **Desultory**, rambling, discursive, loose, unmethodical, superficial, unsettled, erratic, fitful. (Thorough.) **Detail**, n., particular, specification, minutiae. **Detail**, v., particularize, enumerate, specify. (Generalize.) **Deter**, warn, stop, dissuade, terrify, scare. (Encourage.) **Detriment**, loss, harm, injury, deterioration. (Benefit.) **Develop**, unfold, amplify, expand, enlarge. **Device**, artifice, expedient, contrivance. **Devoid**, void, wanting, destitute, unendowed, unprovided. (Full, complete.) **Devoted**, attached, fond, absorbed, dedicated. **Dictate**, prompt, suggest, enjoin, order, command. **Dictatorial**, imperative, imperious, domineering, arbitrary, tyrannical, overbearing. (Submissive.) **Die**, expire, depart, perish, decline, languish, wane, sick, fade, decay. **Diet**, food, victuals, nourishment, nutriment, sustenance, fare. **Difference**, separation, disagreement, discord, dissent, estrangement, variety. **Different**, various, manifold, diverse, unlike, separate, distinct. (Similar homogeneous.) **Difficult**, hard, intricate, involved, perplexing, obscure, unmanageable. (Easy.) **Diffuse**, discursive, prolix,



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diluted, copious. **Dignify**, aggrandize, elevate, invest, exalt, advance, promote, honor. (*Degrade*.) **Dilate**, stretch, widen, expand, swell, distend, enlarge, descendant, expatiate. **Dilatory**, tardy, procrastinating, behindhand, lagging, dawdling. (*Prompt*.) **Diligence**, care, assiduity, attention, heed, industry. (*Negligence*.) **Diminish**, lessen, reduce, contract, curtail, retrench. (*Increase*.) **Disability**, unfitness, incapacity. **Discern**, descry, observe, recognize, see, discriminate, separate, perceive. **Discipline**, order, strictness, training, coercion, punishment, organization. (*Confusion, demoralization*.) **Discover**, make known, find, invent, contrive, expose, reveal. **Discreditable**, shameful, disgraceful, scandalous, disreputable. (*Creditable*.) **Discreet**, cautious, prudent, wary, judicious. (*Indiscreet*.) **Discrepancy**, disagreement, difference, variance. (*Agreement*.) **Discrimination**, acuteness, discernment, judgment, caution. **Disease**, complaint, malady, disorder, ailment, sickness. **Disgrace**, *n.*, disrepute, reproach, dishonor, shame, odium. (*Honor*.) **Disgrace**, *v.*, debase, degrade, defame, discredit. (*Exalt*.) **Disgust**, dislike, distaste, loathing, abomination, abhorrence. (*Admiration*.) **Dishonest**, unjust, fraudulent, unfair, deceitful, cheating, deceptive, wrongful. (*Honest*.) **Dismay**, *v.*, terrify, frighten, scare, daunt, appall, dishearten. (*Encourage*.) **Dismay**, *n.*, terror, dread, fear, fright. (*Assurance*.) **Dismiss**, send off, discharge, discard, banish. (*Retain*.) **Disseal**, scatter, drive away, disperse, dissipate. (*Collect*.) **Display**, show, spread out, exhibit, expose. (*Hide*.) **Dispose**, arrange, place, order, give, bestow. **Dispute**, *v.*, argue, contest, contend, question, impugn. (*Assent*.) **Dispute**, *n.*, argument, debate, controversy, quarrel, disagreement. (*Harmony*.) **Dissent**, disagree, differ, vary. (*Assent*.) **Distinct**, clear, plain, obvious, different, separate. (*Obscure, indistinct*.) **Distinguish**, perceive, discern, mark out, divide, discriminate. **Distinguished**, famous, glorious far-famed, noted, illustrious, eminent, celebrated. (*Obscure, unknown, ordinary*.) **Distract**, perplex, bewilder. (*Calm, concentrate*.) **Distribute**, allot, share, dispense, apportion, deal. (*Collect*.) **Disturb**, derange, discompose, agitate, rouse, interrupt, confuse, annoy, trouble, vex, worry. (*Pacify, quiet*.) **Disuse**, discontinuance, abolition, desuetude. (*Use*.) **Divide**, part, separate, distribute, deal out, sever, sunder. **Divine**, godlike, holy, heavenly, sacred, a parson, clergyman, minister. **Do**, effect, make, perform, accomplish, finished, transact. **Docil**, tractable, teachable, compliant, tame. (*Stubborn*.) **Doctrine**, tenet, articles of belief, creed, dogma, teaching. **Doleful**, dolorous, woe-begone, rueful, dismal, piteous. (*Joyous*.) **Doom**, *n.*, sentence, verdict, judgment, fate, lot, destiny. **Doubt**, *n.*, uncertainty, suspense, hesitation, scruple, ambiguity. (*Certainty*.) **Draw**, pull, haul, drag, attract, inhale, sketch, describe. **Dread**, *n.*, fear horror, terror, alarm, dismay, awe. (*Boldness, assurance*.) **Dreadful**, fearful, frightful, shocking, awful, horrible, horrid, terrific. **Dress**, *n.*, clothing, attire, apparel, garments, costume, garb, livery. **Drift**, purpose, meaning, scope, aim, tendency, direction. **Droll**, funny, laughable, comic, whimsical, queer, amusing. (*Solemn*.) **Drown**, inundate, swamp, submerge, overwhelm, engulf. **Dry**, *a.*, arid, parched, lifeless, dull, tedious, uninteresting, meagre. (*Moist, interesting, succulent*.) **Due**, owing to, attributable to, just, fair, proper, debt, right. **Dull**, stupid, gloomy, sad, dismal, commonplace. (*Bright*.) **Dunce**, simpleton, fool, ninny, idiot. (*Sage*.) **Durable**, lasting, permanent, abiding, continuing. (*Ephemeral, perishable*.) **Dwell**, stay, stop, abide, sojourn, linger, tarry. **Dwindle**, pine, waste, diminish, decrease, fall off. (*Grow*.)

**EAGER**, hot, ardent, impassioned, forward, impatient. (*Diffident*.) **Earn**, acquire, obtain, win, gain, achieve. **Earnest**, *a.*, ardent, serious, grave, solemn, warm. (*Trifling*.) **Earnest**, *n.*, pledge, pawn. **Ease**, *n.*, comfort, rest. (*Worry*.) **Ease**, *v.*, calm, alleviate, allay, mitigate, appease, assuage, pacify, disburden, rid. (*Annoy, worry*.) **Easy**, light, comfortable, unconstrained. (*Difficult, hard*.) **Eccentric**, irregular, anomalous, singular, odd, abnormal, wayward, particular, strange. (*Regular, ordinary*.) **Economical**, sparing, saving, provident, thrifty, frugal, careful, niggardly. (*Wasteful*.) **Edge**, border, brink, rim, brim, margin, verge. **Efface**, blot out, expunge, obliterate, wipe out, cancel, erase. **Effect**, *n.*, consequence, result, issue, event, execution, operation. **Effect**, *v.*, accomplish, fulfill, realize, achieve, execute, operate, complete. **Effective**, efficient, operative, serviceable. (*Vain, ineffectual*.) **Efficacy**, efficiency, energy, agency, instrumen-

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**talitv.** **Efficient**, effectual, effective, competent, capable, able, fitted. **Eliminate**, drive out, expel, thrust out, eject, cast out, oust, dislodge, banish, proscribe. **Eloquence**, oratory, rhetoric, declamation. **Elucidate**, make plain, explain, clear up, illustrate. **Elude**, evade, escape, avoid, shun. **Embarrass**, perplex, entangle, distress, trouble. (Assist.) **Embellish**, adorn, decorate, bedeck, beautify, deck. (Disfigure.) **Embolden**, inspirit, animate, encourage, cheer, urge, impel, stimulate. (Discourage.) **Eminent**, distinguished, signal, conspicuous, noted, prominent, elevated, renowned, famous, glorious, illustrious. (Obscure, unknown.) **Emit**, give out, throw out, exhale, discharge, vent. **Emotion**, perturbation, agitation, trepidation, tremor, mental conflict. **Employ**, occupy, busy, take up with, engross. **Employment**, business, vocation, engagement, office, function, trade, profession, occupation, calling, vocation. **Encompass**, *v.*, encircle, surround, gird, beset. **Encounter**, attack, conflict, combat, assault, onset, engagement, battle, action. **Encourage**, countenance, sanction, support, foster, cherish, inspirit, embolden, animate, cheer, incite, urge, impel, stimulate. (Deter.) **End**, *n.*, aim, object, purpose, result, conclusion, upshot, close, expiration, termination, extremity, sequel. **Endeavor**, attempt, try, essay, strive, aim. **Endurance**, continuation, duration, fortitude, patience, resignation. **Endure**, *v.*, last, continue, support, bear, sustain, suffer, brook, submit to, undergo. (Perish.) **Enemy**, foe, antagonist, adversary, opponent. (Friend.) **Energetic**, industrious, effectual, efficacious, powerful, binding, stringent, forcible, nervous. (Lazy.) **Engage**, employ, busy, occupy, attract, invite, allure, entertain, engross, take up, enlist. **Engross**, absorb, take up, busy, occupy, engage, monopolize. **Engulf**, swallow up, absorb, imbibe, drown, submerge, bury, entomb, overwhelm. **Enjoin**, order, ordain, appoint, prescribe. **Enjoyment**, pleasure, gratification. (Grief, sorrow, sadness.) **Enlarge**, increase, extend, augment, broaden, swell. (Diminish.) **Enlighten**, illumine, illuminate, instruct, inform. (Befog, becloud.) **Enliven**, cheer, vivify, stir up, animate, inspire, exhilarate. (Sadden, quiet.) **Enmity**, animosity, hostility, ill-will, maliciousness. (Friendship.) **Enormous**, gigantic, colossal huge, vast, immense, prodigious. (Insignificant.) **Enough**, sufficient, plenty, abundance. (Want.) **Enraged**, infuriated, raging, wrathful. (Pacified.) **Enrapture**, enchant, fascinate, charm, captivate, bewitch. (Repel.) **Enroll**, enlist, list, register, record. **Enterprise**, undertaking, endeavor, venture, energy. **Enthusiasm**, earnest, devotion, zeal, ardor. (Ennui, lukewarmness.) **Enthusiast**, fanatic, visionary. **Equal**, equable, even, like, alike, uniform. (Unequal.) **Eradicate**, root out, extirpate, exterminate. **Erroneous**, incorrect, inaccurate, inexact. (Exact.) **Error**, blunder, mistake. (Truth.) **Especially**, chiefly, particularly, principally. (Generally.) **Essay**, dissertation, tract, treatise. **Establish**, build up, confirm. (Overthrow.) **Esteem**, regard, respect. (Contempt.) **Estimate**, appraise, appreciate, esteem, compute, rate. **Estrangement**, abstraction, alienation. **Eternal**, endless, everlasting. (Finite.) **Evade**, equivocate, prevaricate. **Even**, level, plain, smooth. (Uneven.) **Event**, accident, adventure, incident, occurrence. **Evil**, ill, harm, mischief, misfortune. (Good.) **Exact**, nice, particular, punctual. (Inexact.) **Exalt**, ennoble, dignify, raise. (Humble.) **Examination**, investigation, inquiry, research, search, scrutiny. **Exceed**, excel, outdo, surpass, transcend. (Fall Short.) **Exceptional**, uncommon, rare, extraordinary. (Common.) **Excite**, awaken, provoke, rouse, stir up. (Lull.) **Excursion**, jaunt, ramble, tour, trip. **Execute**, fulfill, perform. **Exempt**, free, cleared. (Subject.) **Exercise**, practice. **Exhaustive**, thorough, complete. (Cursory.) **Exigency**, emergency. **Experiment**, proof, trial, test. **Explain**, expound, interpret, illustrate, elucidate. **Express**, declare, signify, utter, tell. **Extend**, reach, stretch. (Abridge.) **Extravagant**, lavish, profuse, prodigal. (Parsimonious.)

**FABLE**, apologue, novel, romance, tale. **Face**, visage, countenance. **Facetious**, pleasant, jocular, jocose. (Serious.) **Factor**, agent. **Fail**, to fall short, be deficient. (Accomplish.) **Faint**, languid. (Forcible.) **Fair**, clear. (Stormy.) **Fair**, equitable, honest, reasonable. (Unfair.) **Faith**, creed. (Unbelief, infidelity.) **Faithful**, true, loyal, constant. (Faithless.) **Faithless**, perfidious, treacherous. (Faithful.) **Fall**, drop, droop, sink, tumble. (Rise.) **Fame**, renown, reputation, famous, celebrated, renowned, illustrious. (Obscure.) **Fanciful**, capricious, fantastical, whimsical. **Fancy**, imagination. **Fast**, rapid, quick, fleet, expedi-

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tious. (Slow.) **Fatigue**, weariness, lassitude. (Vigor.) **Fear**, timidity, timorousness. (Bravery.) **Feeling**, sensation, sense. **Feeling**, sensibility, susceptibility. (Insensibility.) **Ferocious**, fierce, savage, wild, barbarous. (Mild.) **Fertile**, fruitful, prolific, plenteous, productive. (Sterile.) **Fiction**, falsehood, fabrication. (Fact) **Figure**, allegory, emblem, metaphor, symbol, type **Find**, find out, descry, discover, espy. (Lose, overlook.) **Fine**, *a*, delicate, nice. (Coarse.) **Fine**, forfeit, forfeiture, mulct, penalty. **Fire**, glow, heat, warmth. **Firm**, constant, solid, steadfast, fixed, stable. (Weak.) **First**, foremost, earliest (Last.) **Fit**, accommodate, adapt, adjust, suit. **Fix**, determine, establish, settle, limit. **Flame**, blaze, flare, flash, glare. **Flat**, level, even. **Flexible**, pliant, pliable, ductile, supple. (Inflexible.) **Flourish**, prosper, thrive. (Decay.) **Fluctuating**, wavering, hesitating, oscillating, vacillating, change. (Firm, steadfast, decided.) **Fluent**, flowing, glib, voluble, unembarrassed, ready. (Hesitating.) **Folks**, persons, people, individuals. **Follow**, succeed, ensue, imitate, copy, pursue. **Follower**, partisan, disciple, adherent, retainer, pursuer, successor **Folly**, silliness, foolishness, imbecility, weakness. (Wisdom) **Fond**, enamored, attached, affectionate. (Distant.) **Fondness**, affection, attachment, kindness, love. (Aversion.) **Foolhardy**, venturesome, incautious, hasty, adventurous, rash. (Cautious.) **Foolish**, simple, silly, irrational, brainless, imbecile, crazy, absurd, preposterous, ridiculous, nonsensical (Wise, discreet.) **Fop**, dandy, dude, beau, coxcomb, puppy, jackanapes (Gentlemen.) **Forbear**, abstain, refrain, withhold. **Force**, *n*, strength, vigor, dint, might, energy, power, violence, army, host. **Force**, *v*, compel. (Persuade.) **Forecast**, forethought, foresight, premeditation, prognostication. **Forego**, quit, relinquish, let go, waive. **Foregoing**, antecedent, anterior, preceding, previous, prior, former. **Forerunner**, herald, harbinger, precursor, omen. **Foresight**, forethought, forecast, premeditation. **Forge**, coin, invent, frame, feign, fabricate, counterfeit. **Forgive**, pardon, remit, absolve, acquit, excuse, except. **Forlorn**, forsaken, abandoned, deserted, desolate, lone, lonesome. **Form**, *n*, ceremony, solemnity, observance, rite, figure, shape, conformation, fashion, appearance, representation, semblance. **Form**, *v*, make, create, produce, constitute, arrange, fashion, mould, shape. **Formal**, ceremonious, precise, exact, stiff, methodical, affected. (Informal, natural.) **Former**, antecedent, anterior, previous, prior, preceding, foregoing. **Forsaken**, abandoned, forlorn, deserted, desolate, lone, lonesome. **Forthwith**, immediately, directly, instantly, instantaneously. (Anon.) **Fortitude**, endurance, resolution, fearlessness, dauntlessness. (Weakness) **Fortunate**, lucky, happy, auspicious, prosperous, successful. (Unfortunate.) **Fortune**, chance, fate, luck, doom, destiny, property, possession, riches **Foster**, cherish, nurse, tend, harbor, nurture. (Neglect.) **Foul**, impure, nasty, filthy, dirty, unclean, defiled. (Pure, clean.) **Fractious**, cross, capitious, petulant, touchy, testy, peevish, fretful, splenetic. (Tractable.) **Fragile**, brittle, frail, delicate, feeble. (Strong) **Fragments**, pieces, scraps, chips, leavings, remains, remnants **Frailty**, weakness, failing, foible, imperfection, fault, blemish. (Strength.) **Frame**, *v*, construct, invent, coin, fabricate, forge, mold, feign, make, compose. **Franchise**, right, exemption, immunity, privilege, freedom, suffrage **Frank**, artless, candid, sincere, free, easy, familiar, open, ingenuous, plain. (Tricky, insincere.) **Frantic**, distracted, mad, furious, raving, frenzied. (Quiet, subdued.) **Fraud**, deceit, deception, duplicity, guile, cheat, imposition. (Honesty.) **Freak**, fancy, humor, vagary, whim, caprice, crotchet. (Purpose, resolution) **Free**, *a*, liberal, generous, bountiful, bounteous, munificent, frank, artless, candid, familiar, open, independent, unconfinced, unreserved, unrestricted, exempt, clear, loose, easy, careless. (Slavish, stingy, artful, costly.) **Free**, *v*, release, set free, deliver, rescue, liberate, enfranchise, affranchise, emancipate, exempt (Enslave, bind.) **Freedom**, liberty, independence, unrestraint, familiarity, license, franchise, exemption, privilege. (Slavery.) **Frequent**, often, common, usual, general. (Rare.) **Fret**, gall, chafe, agitate, irritate, vex. **Friendly**, amicable, social, sociable. (Distant, reserved cool.) **Frightful**, fearful, dreadful, dire, direful, terrific, awful, horrible, horrid. **Frivolous**, trifling, trivial, petty. (Serious, earnest.) **Frugal**, provident, economical, saving (Wasteful, extravagant.) **Fruitful**, fertile, prolific, productive, abundant, plentiful, plenteous. (Barren, sterile.) **Fruitless**, vain, useless, idle, abortive, bootless, unavailing, without avail. **Frustrate**, defeat, foil, balk, disappoint. **Fulfill**, accomplish, effect,

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complete. Fully, completely, abundantly, perfectly. **Fulsome**, coarse gross, sickening, offensive, rank. (Moderate) **Furious**, violent, boisterous, vehement, dashing, sweeping, rolling, impetuous, frantic, distracted, stormy, angry, raging, fierce. (Calm.) **Futile**, trifling, trivial, frivolous, useless. (Effective.)

**GAIN**, *v.*, profit, emolument, advantage, benefit, winnings, earnings. (Loss.) **Gain**, *v.*, get, acquire, obtain, attain, procure, earn, win, achieve, reap, realize, reach. (Lose) **Gallant**, brave, bold, courageous, gay, fine, showy, intrepid, fearless, heroic. **Galling**, chafing, irritating, vexing. (Soothing.) **Game**, play, pastime, diversion, sport, amusement. **Gang**, band, horde, company, troop, crew. **Gap**, breach, charm, hollow, cavity cleft, crevice, rift, chink. **Garnish**, embellish, adorn, beautify, deck, decorate. **Gather**, pick, cull, assemble, muster, infer, collect. (Scatter.) **Gaudy**, showy, flashy, tawdry, gay, glittering, bespangled. (Sombre) **Gaunt**, emaciated, scraggy, skinny, meagre, lank, attenuated, spare, lean, thin (Well-fed.) **Gay**, cheerful, merry, lively, jolly, sprightly, blithe. (Solemn) **Generate**, form, make, beget, produce. **Generation**, formation, race, breed, stock, kind, age, era. **Generous**, beneficent, noble, honorable, bountiful, liberal, free. (Niggardly.) **Genial**, cordial, hearty, festive, joyous (Distant, cold.) **Genius**, intellect, invention, talent, taste, nature, character, adept. **Gen- teel**, refined, polished, fashionable, polite, well-bred (Boorish) **Gentle**, placid, mild, bland, meek, tame, docile. (Rough, uncouth.) **Genuine**, real, true, unaffected, sincere. (False.) **Gesture**, attitude, action, posture. **Get**, obtain, earn, gain, attain, procure, achieve. **Ghostly**, pallid, wan, hideous, grim, shocking. **Ghost**, spectre, sprite, apparition, shade, phantom. **Gibe**, scoff, sneer, flout, jeer, mock, taunt, deride. **Giddy**, unsteady, flighty, thoughtless. (Steady.) **Gift**, donation, benefaction, grant, alms, gratuity, boon, present, faculty, talent. (Purchase.) **Gigantic**, colossal, huge, enormous, vast, prodigious, immense. (Diminutive.) **Give**, grant, bestow, confer, yield, impart. **Glad**, pleased, cheerful, joyful, gladsome, gratified, cheering. (Sad) **Gleam**, glimmer, glance, glitter, shine, flash. **Glee**, gaiety, merriment, mirth, joviality, jovialness, catch. (Sorrow.) **Glide**, slip, slide, run, roll on. **Glimmer**, *v.*, gleam, flicker, glitter. **Glimpse**, glance, look, glint. **Glitter**, gleam, shine, glisten, glister, radiate. **Gloom**, cloud, darkness, dimness, blackness, dullness, sadness. (Light, brightness, joy.) **Gloomy**, lowering, lurid, dim, dusky, sad, glum. (Bright, clear.) **Glorify**, magnify, celebrate, adore, exalt. **Glorious**, famous, renowned, distinguished, noble, exalted. (Infamous) **Glory**, honor, fame, renown, splendor, grandeur. (Infamy.) **Glut**, gorge, stuff, cram, cloy, satiate, block up. **Go**, depart, proceed, move, budge, stir. **God**, creator, lord, almighty, Jehovah, omnipotence, providence. **Godly**, righteous, devout, holy, pious, religious. **Good**, benefit, weal, advantage, profit, boon. (Evil.) **Good**, *a.*, virtuous, righteous, upright, just, true. (Wicked, bad.) **Gorge**, glut, fill, cram, stuff, satiate. **Gorg-ous**, superb, grand, magnificent, splendid. (Plain, simple.) **Govern**, rule, direct, manage, command. **Government**, rule, state, control, sway. **Graceful**, becoming, comely, elegant, beautiful. (Awkward.) **Gracious**, merciful, kindly, beneficent. **Gradual**, slow, progressive. (Sudden.) **Grand**, majestic, stately, dignified, lofty, elevated, exalted, splendid, gorgeous, superb, magnificent, sublime, pompous. (Shabby.) **Grant**, bestow, impart, give, yield, cede, allow, confer, invest. **Grant**, gift, boon, donation. **Graphic**, forcible, telling, picturesque, vivid, pictorial. **Grasp**, catch, seize, gripe, clasp, grapple. **Grateful**, agreeable, pleasing, welcome, thankful. (Harsh) **Gra-ification**, enjoyment, pleasure, delight, reward. (Disappointment.) **Grave**, *a.*, serious, sedate, solemn, sober, pressing, heavy. (Giddy.) **Grave**, *s.*, tomb, sepulchre, vault. **Great**, big, huge, large, majestic, vast, grand, noble, august. (Small.) **Greediness**, avidity, eagerness, voracity. (Generosity.) **Grief**, affliction, sorrow, trial, woe, tribulation. (Joy.) **Grieve**, mourn, lament, sorrow, pain, hurt, wound, bewail. (Rejoice.) **Grievous**, painful, afflicting, heavy, baleful, unhappy. **Grind**, crush, oppress, grate, harass, afflict. **Grisly**, terrible, hideous, grim, ghastly, dreadful. (Pleasing.) **Gross**, coarse, outrageous, unseemly, shameful, indelicate. (Delicate.) **Group**, assembly, cluster, collection, clump, order, class. **Grovel**, crawl, cringe, fawn, sneak. **Grow**, increase, vegetate, expand, advance. (Decay, diminution.) **Growl**, grumble, snarl, murmur, complain. **Grudge**, malice, rancor, spite, pique, hatred, aversion. **Gruff**, rough, rugged.

## SYNONYMS AND ANTONYMS.

**blunt**, rude, harsh, surly, bearish. (Pleasant.) **Guiltless**, harmless, innocent. **Guiltily**, culpable, sinful, criminal.

**HABIT**, custom, practice. **Hall**, accost, address, greet, salute, welcome. **Happiness**, beatitude, blessedness, bliss, felicity. (Unhappiness.) **Harbor**, haven, port. **Hard**, firm, solid. (Soft.) **Hard**, arduous, difficult. (Easy.) **Harm**, injury, hurt, wrong, infliction. (Benefit.) **Harmless**, safe, innocuous, innocent. (Hurtful.) **Harsh**, rough, rigorous, severe, gruff, morose. (Gentle.) **Hasten**, accelerate, despatch, expedite, speed. (Delay.) **Hasty**, hurried, ill-advised. (Deliberate.) **Hateful**, odious, detestable. (Lovable.) **Hatred**, enmity, ill-will, rancor. (Friendship.) **Haughtiness**, arrogance, pride. (Modesty.) **Haughty**, arrogant, disdainful, supercilious, proud. **Hazard**, risk, venture. **Healthy**, salubrious, salutary, wholesome. (Unhealthy.) **Heap**, accumulate, amass, pile. **Hearty**, *a.*, cordial, sincere, warm. (Insincere.) **Heavy**, burdensome, ponderous, weighty. (Light.) **Heed**, care, attention. **Heighten**, enhance, exalt, elevate, raise. **Heinous**, atrocious, flagitious, flagrant. (Venial.) **Help**, aid, assist, relieve, succor. (Hinder.) **Heretic**, sectary, sectarian, schismatic, dissenter, non-conformist. **Hesitate**, falter, stammer, stutter. **Hideous**, grim, ghastly, grisly. (Beautiful.) **High**, lofty, tall, elevated. (Deep.) **Hinder**, impede, obstruct, prevent. (Help.) **Hint**, allude, refer, suggest, intimate, insinuate. **Hold**, detain, keep, retain. **Holiness**, sanctity, piety, sacredness. **Holy**, devout, pious, religious. **Homely**, plain, ugly, coarse. (Beautiful.) **Honesty**, integrity, probity, uprightness. (Dishonesty.) **Honor**, *v.*, respect, reverence, esteem. (Dishonor.) **Hope**, confidence, expectation, trust. **Hopeless**, desperate. **Hot**, ardent, burning, fiery. (Cold.) **However**, nevertheless, notwithstanding, yet. **Humble**, modest, submissive, plain, unostentatious, simple. (Haughty.) **Humble**, degrade, humiliate, mortify, abase. (Exalt.) **Humor**, mood, temper. **Hunt**, seek, chase. **Hurtful**, noxious, pernicious. (Beneficial.) **Husbandry**, cultivation, tillage. **Hypocrite**, dissembler, impostor, canter. **Hypothesis**, theory, supposition.

**IDEA**, thought, imagination. **Ideal**, imaginary, fancied. (Actual.) **Idle**, indolent, lazy. (Industrious.) **Ignominious**, shameful, scandalous, infamous. (Honorable.) **Ignominy**, shame, disgrace, obloquy, infamy, reproach. **Ignorant**, unlearned, illiterate, uninformed, uneducated. (Knowing.) **Ill**, *a.*, evil, wickedness, misfortune, mischief, harm. (Good.) **Ill**, *a.*, sick, indisposed, unwell, diseased. (Well.) **Ill-tempered**, crabbed, sour, surly, acrimonious. (Good-natured.) **Ill-will**, enmity, hatred, antipathy. (Good-will.) **Illegal**, unlawful, illicit, contraband, illegitimate. (Legal.) **Illimitable**, boundless, immeasurable, unlimited, infinite. **Illiterate**, unlettered, unlearned, untaught, uninstructed. (Learned, educated.) **Illusion**, fallacy, deception, phantasm. **Illusory**, imaginary, chimerical, visionary. (Real.) **Illustrate**, explain, elucidate, clear. **Illustrious**, celebrated, noble, eminent, famous, renowned. (Obscure.) **Image**, likeness, picture, representation, effigy. **Imaginary**, ideal, fanciful, illusory. (Real.) **Imagine**, conceive, fancy, apprehend, think, presume. **Imbecility**, silliness, senility, dotage. **Imitate**, copy, ape, mimic, mock, counterfeit. **Immaculate**, unspotted, spotless, unsullied, stainless. (Soiled.) **Immediate**, pressing, instant, next, proximate. **Immediately**, instantly, forthwith, directly, presently. **Immense**, vast, enormous, huge, prodigious, monstrous. **Immunity**, privilege, prerogative, exemption. **Impair**, injure, diminish, decrease. **Impart**, reveal, divulge, disclose, discover, bestow, afford. **Impartial**, just, equitable, unbiased. (Partial.) **Impassioned**, glowing, burning, fiery, vehement, intense. **Impeach**, accuse, charge, arraign, censure. **Impede**, hinder, retard, obstruct, prevent. (Help.) **Impediment**, obstruction, hindrance, obstacle, barrier. (Aid.) **Impel**, animate, induce, incite, instigate, embolden. (Retard.) **Impending**, imminent, threatening. **Imperative**, commanding, authoritative, despotic. **Imperfection**, fault, blemish, defect, vice. **Imperil**, endanger, hazard, jeopardize. **Imperious**, commanding, dictatorial, authoritative, imperative, lordly, overbearing, domineering. **Impertinent**, intrusive, meddling, officious, rude, saucy, impudent, insolent. **Impetuous**, violent, boisterous, furious, vehement. (Calm.) **Impious**, profane, irreligious, godless. (Reverent.) **Implicate**, involve, entangle, embarrass, compromise. **Imply**, involve, comprise, infold, import, denote, signify. **Importance**, signification, significance, avail, consequence, weight,

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gravity, moment. **Imposing**, impressive, striking, majestic, august, noble, grand. (Insignificant.) **Impotence**, weakness, incapacity, infirmity, frailty, feebleness. (Power.) **Impotent**, weak, feeble, helpless, enfeebled, nerveless, infirm. (Strong.) **Impressive**, stirring, forcible, exciting, affecting, moving. **Imprison**, incarcerate, shut up, immure, confine. (Liberate.) **Imprisonment**, captivity, duration. **Improve**, amend, better, mend, reform, rectify, ameliorate, apply, use, employ. (Deteriorate.) **Improvident**, careless, incautious, imprudent, prodigal, wasteful, reckless, rash. (Thrifty.) **Impudence**, assurance, impertinence, confidence, insolence, rudeness. **Impudent**, saucy, brazen, bold, impertinent, forward, rude, insolent, immodest, shameless. **Impulse**, incentive, incitement, motive, instigation. **Impulsive**, rash, hasty, forcible, violent. (Deliberate.) **Imputation**, blame, censure, reproach, charge, accusation. **Inadvertency**, error, oversight, blunder, inattention, carelessness, negligence. **Incentive**, motive, inducement, impulse. **Incite**, instigate, excite, provoke, stimulate, encourage, urge, impel. **Inclination**, leaning, slope, disposition, tendency, bent, bias, affection, attachment, wish, liking, desire. (Aversion.) **Incline**, *v.*, slope, lean, slant, tend, bend, turn, bias, dispose. **Inclose**, surround, shut in, fence in, cover, wrap. **Include**, comprehend, comprise, contain, embrace, take in. **Incommode**, annoy, plague, molest, disturb, inconvenience, trouble. (Accomodate.) **Incompetent**, incapable, unable, inadequate, insufficient. (Competent.) **Increase**, *v.*, extend, enlarge, augment, dilate, expand, amplify, raise, enhance, aggravate, magnify, grow. (Diminish.) **Increase**, *n.*, augmentation, accession, addition, enlargement, extension. (Decrease.) **Incumbent**, obligatory. **Indefinite**, vague, uncertain, unsettled, loose, lax. (Definite.) **Indicate**, point out, show, mark. **Indifference**, apathy, carelessness, listlessness, insensibility. (Application, assiduity.) **Indigence**, want, neediness, penury, poverty, destitution, privation. (Affluence.) **Indignation**, anger, wrath, ire, resentment. **Indignity**, insult, affront, outrage, obloquy, opprobrium, reproach, ignominy. (Honor.) **Indiscriminate**, promiscuous, chance, indistinct, confused. (Select, chosen.) **Indispensable**, essential, necessary, requisite, expedient. (Unnecessary, superfluous.) **Indisputable**, undeniable, undoubted, incontestable, indubitable, unquestionable, sure, infallible. **Indorse**, ratify, confirm, superscribe. **Indulge**, foster, cherish, fondle. (Deny.) **Ineffectual**, vain, useless, unavailing, fruitless, abortive, inoperative. (Effective.) **Inequality**, disparity, disproportion, dissimilarity, unevenness. (Equality.) **Inevitable**, unavoidable, not to be avoided, certain. **Infamous**, scandalous, shameful, ignominious, opprobrious, disgraceful. (Honorable.) **Inference**, deduction, corollary, conclusion, consequence. **Infernal**, diabolical, fiendish, devilish, hellish. **Infest**, annoy, plague, harass, disturb. **Infirm**, weak, feeble, enfeebled. (Robust.) **Inflame**, anger, irritate, enrage, chafe, incense, nettle, aggravate, embitter, exasperate. (Allay, soothe.) **Influence**, *v.*, bias, sway, prejudice, prepossess. **Influence**, *n.*, credit, favor, reputation, character, weight, authority, sway, ascendancy. **Infringe**, invade, intrude, contravene, break, transgress, violate. **Ingenuous**, artless, candid, generous, open, frank, plain, sincere. (Crafty.) **Inhuman**, cruel, brutal, savage, barbarous, ruthless, merciless, ferocious. (Humane.) **Iniquity**, injustice, wrong, grievance. **Injure**, damage, hurt, deteriorate, wrong, aggrieve, harm, spoil, mar, sully. (Benefit.) **Injurious**, hurtful, baneful, pernicious, deleterious, noxious, prejudicial, wrongful, damaging. (Beneficial.) **Injustice**, wrong, iniquity, grievance. (Right.) **Innocent**, guiltless, sinless, harmless, inoffensive, innoxious. (Guilty.) **Innocuous**, harmless, safe, innocent. (Hurtful.) **Inordinate**, intemperate, irregular, disorderly, excessive, immoderate. (Moderate.) **Inquiry**, investigation, examination, research, scrutiny, disquisition, question, query, interrogation. **Inquisitive**, prying, peeping, curious, peering. **Insane**, mad, deranged, delirious, demented. (Sane.) **Insanity**, madness, mental aberration, lunacy, delirium. (Sanity.) **Insinuate**, hint, intimate, suggest, infuse, introduce, ingratiate. **Insipid**, dull, flat, mawkish, tasteless, vapid, inanimate, lifeless. (Bright, sparkling.) **Insolent**, rude, saucy, pert, impertinent, abusive, scurrilous, opprobrious, insulting, offensive. **Inspire**, animate, exhilarate, enliven, cheer, breathe, inhale. **Instability**, mutability, fickleness, mutableness, wavering. (Stability, firmness.) **Instigate**, stir up, persuade, animate, incite, urge, stimulate, encourage. **Instill**, implant, inculcate, infuse, insinuate. **Instruct**, inform, teach, educate, enlighten, initiate. **Instrumental**, conducive, assistant, helping,

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**ministerial.** **Insufficiency**, inadequacy, incompetency, incapability, deficiency, lack. **Insult**, affront, outrage, indignity, blasphemy. (Honor.) **Insulting**, insolent, rude, saucy, impertinent, impudent, abusive. **Integrity**, uprightness, honesty, probity, entirety, entireness, completeness, rectitude, purity. (Dishonesty.) **Intellect**, understanding, sense, brains, mind, intelligence, ability, talent, genius. (Body.) **Intellectual**, mental, ideal, metaphysical. (Brutal.) **Intelligible**, clear, obvious, plain, distinct. (Abstruse.) **Intemperate**, immoderate, excessive, drunken, nimicis, inordinate. (Temperate.) **Intense**, ardent, earnest, glowing, fervid, burning, vehement. **Intent**, design, purpose, intention, drift, view, aim, purport, meaning. **Intercourse**, commerce, connection, intimacy, acquaintance. **Interdict**, forbid, prohibit, inhibit, proscribe, debar, restrain from. (Allow.) **Interfere**, meddle, intermeddle, interpose. **Interminable**, endless, interminate, infinite, unlimited, illimitable, boundless, limitless. (Brief, concise.) **Interpose**, intercede, arbitrate, mediate, interfere, meddle. **Interpret**, explain, expound, elucidate, unfold, decipher. **Intimate**, hint, suggest, insinuate, express, signify, impart, tell. **Intimidate**, dishearten, alarm, frighten, scare, appal, daunt, cow, browbeat. (Encourage.) **Intolerable**, insufferable, unbearable, insupportable, unendurable. **Intrepid**, bold, brave, daring, fearless, dauntless, undaunted, courageous, valorous, valiant, heroic, gallant, chivalrous, doughty. (Cowardly, faint-hearted.) **Intrigue**, plot, cabal, conspiracy, combination, artifice, ruse, *amour*. **Intrinsic**, real, true, genuine, sterling, native, natural. (Extrinsic.) **Invalidate**, quash, cancel, overthrow, vacate, nullify, annul. **Invasion**, incursion, irruption, inroad, aggression, raid, fray. **Invective**, abuse, reproach, railing, censure, sarcasm, satire. **Invent**, devise, contrive, frame, find out, discover, design. **Investigation**, examination, search, inquiry, research, scrutiny. **Inveterate**, confirmed, chronic, malignant. (Inchoate.) **Invidious**, envious, hateful, odious, malignant. **Invigorate**, brace, harden, nerve, strengthen, fortify. (Enervate.) **Invincible**, unconquerable, impregnable, insurmountable. **Invisible**, unseen, imperceptible, impalpable, unperceivable. **Invite**, ask, call, bid, request, allure, attract, solicit. **Invoke**, invoke, call upon, appeal, refer, implore, beseech. **Involve**, implicate, entangle, compromise, envelop. **Irksome**, wearisome, tiresome, tedious, annoying. (Pleasant.) **Irony**, sarcasm, satire, ridicule, raillery. **Irrational**, foolish, silly, imbecile, brutish, absurd, ridiculous. (Rational.) **Irregular**, eccentric, anomalous, inordinate, intemperate. (Regular.) **Irreligious**, profane, godless, impious, sacrilegious, desecrating. **Irreproachable**, blameless, spotless, irreprovable. **Irresistible**, resistless, irrepressible. **Irresolute**, wavering, undetermined, undecided, vacillating. (Determined.) **Irritable**, excitable, irascible, susceptible, sensitive. (Calm.) **Irritate**, aggravate, worry, embitter, madden, exasperate. **Issue**, *v.*, emerge, rise, proceed, flow, spring, emanate. **Issue**, *n.*, end, upshot, effect, result, offspring, progeny.

**JADE**, harass, weary, tire, worry. **Jangle**, wrangle, conflict, disagree. **Jarring**, conflicting, discordant, in consonant, inconsistent. **Jaunt**, ramble, excursion, trip. **Jealousy**, suspicion, envy. **Jeopard**, hazard, peril, endanger. **Jest**, joke, sport, divert, make game of. **Journey**, travel, tour, passage. **Joy**, gladness, mirth, delight. (Grief.) **Judge**, justice, referee, arbitrator. **Joyful**, glad, rejoicing, exultant. (Mournful.) **Judgment**, discernment, discrimination, understanding. **Justice**, equity, right. Justice is right as established by law; equity according to the circumstances of each particular case. (Injustice.) **Justness**, accuracy, correctness, precision.

**KEEP**, preserve, save. (Abandon.) **Kill**, assassinate, murder, slay. **Kindred**, affinity, consanguinity, relationship. **Knowledge**, erudition, learning, science. (Ignorance.)

**LABOR**, toil, work, effort, drudgery. (Idleness.) **Lack**, need, deficiency, scarcity, insufficiency. (Plenty.) **Lament**, mourn, grieve, weep. (Rejoice.) **Language**, dialect, idiom, speech, tongue. **Lascivious**, loose, unchaste, lustful, lewd, lecherous. (Chaste.) **Last**, final, latest, ultimate. (First.) **Laudable**, commendable, praiseworthy. (Blamable.) **Laughable**, comical, droll, ludicrous. (Serious.) **Lawful**, legal, legitimate, licit. (Illegal.) **Lead**, conduct, guide. (Follow.) **Lean**, meagre. (Fat.) **Learned**, erudite, scholarly. (Ignorant.) **Leave**, *v.*, quit, relinquish. **Leave**, *n.*, liberty, permission, licence. (Prohibition.)

## SYNONYMS AND ANTONYMS.

**Life**, existence, animation, spirit, vivacity. (Death.) **Lifeless**, dead, inanimate. **Lift**, erect, elevate, exalt, raise. (Lower.) **Light**, clear, bright. (Dark.) **Lightness**, flightiness, giddiness, levity, volatility. (Seriousness) **Likeness**, resemblance, similarity. (Unlikeness.) **Linger**, lag, loiter, tarry, saunter. (Hasten.) **Little**, diminutive, small. (Great) **Livelihood**, living, maintenance, subsistence, support. **Lively**, jocund, merry, sportive, sprightly, vivacious. (Slow, languid, sluggish) **Long**, extended, extensive (Short) **Look**, appear, seem. **Lose**, miss, forfeit. (Gain.) **Loss**, detriment, damage, deprivation. (Gain) **Loud**, clamorous, high-sounding, noisy. (Low, quiet) **Love**, affection, (Hatred.) **Low**, abject, mean. (Noble.) **Lunacy**, derangement, insanity, mania, madness (Sanity.) **Lustre**, brightness, brilliancy, splendor. **Luxuriant**, exuberant. (Sparse.)

**MACHINATION**, plot, intrigue, cabal, conspiracy. (Artlessness.) **Mad**, crazy, delirious, insane, rabid, violent, frantic. (Sane, rational, quiet.) **Madness**, insanity, fury, rage, frenzy. **Magisterial**, august, dignified, majestic, pompous, stately. **Make**, form, create, produce. (Destroy.) **Malediction**, anathema, curse, imprecation, execration. **Malevolent**, malicious, virulent, malignant. (Benevolent) **Malice**, spite, rancor, ill-feeling, grudge, animosity, ill-will. (Benignity.) **Malicious**, see malevolent. **Manacle**, v., shackle, fetter, chain. (Free) **Manage**, contrive, concert, direct. **Management**, direction, superintendence, care, economy. **Mangle**, tear, lacerate, mutilate, cripple, maim. **Mania**, madness, insanity, lunacy. **Manifest**, v., reveal, prove, evince, exhibit, display, show. **Manifest**, a., clear, plain, evident, open, apparent, visible. (Hidden, occult.) **Manifold**, several, sundry, various, divers, numerous. **Manly**, masculine, vigorous, courageous, brave, heroic. (Effeminate.) **Manner**, habit, custom, way, air, look, appearance. **Manners**, morals, habits, behavior, carriage. **Mar.** spoil, ruin, disfigure. (Improve.) **March**, tramp, tread, walk, step, space. **Margin**, edge, rim border, brink, verge. **Mark**, v., sign, note, symptom, token, indication, trace, vestige, track, badge, brand. **Mark**, v., impress, print, stamp, engrave, note, designate. **Marriage**, wedding, nuptials, matrimony, wedlock. **Martial**, military, warlike, soldier-like. **Marvel**, wonder, miracle, prodigy. **Marvelous**, wondrous, wonderful, amazing, miraculous. **Massive**, bulky, heavy, weighty, ponderous, solid, substantial. (Flimsy.) **Mastery**, dominion, rule, sway, ascendancy, supremacy. **Matchless**, unrivaled, unequalled, unparalleled, peerless, incomparable, inimitable, surpassing. (Common, ordinary.) **Material**, a., corporeal, bodily, physical, temporal, momentous, important. (Spiritual, immaterial.) **Maxim**, adage, apophthegm, proverb, saying, by-word, saw. **Meager**, poor, lank, emaciated, barren, dry, uninteresting. (Rich) **Mean**, a., stingy, niggardly, low, abject, vile, ignoble, degraded, contemptible, vulgar, despicable. (Generous.) **Mean**, v., design, purpose, intent, contemplate, signify, denote, indicate. **Meaning**, signification, import, acceptance, sense, purport. **Medium**, organ, channel, instrument, means. **Medley**, mixture, variety, diversity, miscellany. **Meek**, unassuming, mild, gentle. (Proud.) **Melancholy**, low-spirited, dispirited, dreamy, sad. **Jolly**, buoyant) **Mellow**, ripe, mature, soft (Immature) **Melodious**, tuneful, musical, silver, dulcet, sweet (Discordant) **Memorable**, signal, distinguished, marked. **Memorial**, monument, memento, commemoration. **Memory**, remembrance, recollection. **Menace**, v., threat. **Mend**, repair, amend, correct, better, ameliorate, improve, rectify. **Mention**, tell, name, communicate, impart, divulge, reveal, disclose, inform, acquaint. **Merciful**, compassionate, lenient, clement, tender, gracious, kind. (Cruel) **Merciless**, hard-hearted, cruel, unmerciful, pitiless, remorseless, unrelenting. (Kind.) **Merriment**, mirth, joviality, jollity, hilarity. (Sorrow.) **Merry**, cheerful, mirthful, joyous, gay, lively, sprightly, hilarious, blithe, blithesome, jovial, sportive, jolly. (Sad.) **Metaphorical**, figurative, allegorical, symbolical. **Method**, way, manner, mode, process, order, rule, regularity, system. **Mien**, air, look, manner, aspect, appearance. **Migratory**, roving, strolling, wandering, vagrant. (Settled, sedate, permanent) **Mimic**, imitate, ape, mock. **Mindful**, observant, attentive, heedful, thoughtful. (Heedless) **Miscellaneous**, promiscuous, indiscriminate, mixed. **Mischief**, injury, harm, damage, hurt, evil, ill. (Benefit) **Miscrant**, catiff, villain, ruffian. **Miserable**, unhappy, wretched, distressed, afflicted. (Happy.) **Miserly**, stingy, niggardly, avaricious, griping. **Misery**, wretched-



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ness, woe, destitution, penury, privation, beggary. (Happiness.) **Misfortune**, calamity, disaster, mishap, catastrophe. (Good luck.) **Miss**, omit, lose, fail, miscarry. **Mitigate**, alleviate, relieve, abate, diminish. (Aggravate.) **Moderate**, temperate, abstemious, sober, abstinent. (Immoderate.) **Modest**, chaste, virtuous, bashful, reserved. (Immodest.) **Moist**, wet, damp, dank, humid. (Dry.) **Monotonous**, unvaried, dull, tiresome, undiversified. (Varied.) **Monstrous**, shocking, dreadful, horrible, huge, immense. **Monument**, memorial, record, remembrancer, cenotaph. **Mood**, humor, disposition, vein, temper. **Morbid**, sick, ailing, sickly, diseased, corrupted. (Normal, sound.) **Morose**, gloomy, sullen, surly, fretful, crabbed, crusty. (Joyous.) **Mortal**, deadly, fatal, human. **Motion**, proposition, proposal, movement. **Motionless**, still, stationary, torpid, stagnant. (Active, moving) **Mount**, arise, rise, ascend, soar, tower, climb, scale. **Mournful**, sad, sorrowful, lugubrious, grievous, doleful, heavy. (Happy.) **Move**, actuate, impel, induce, prompt, instigate, persuade, stir, agitate, propel, push. **Multitude**, crowd, throng, host, mob, swarm. **Murder**, *v.*, kill, assassinate, slay, massacre, despatch. **Muse**, *v.*, meditate, contemplate, think, reflect, cogitate, ponder. **Music**, harmony, melody, symphony. **Musical**, tuneful, melodious, harmonious, dulcet, sweet. **Musty**, stale, sour, fetid. (Fresh, sweet.) **Mute**, dumb, silent, speechless. **Mutilate**, maim, cripple, disable, disfigure. **Mutinous**, insurgent, seditious, tumultuous, turbulent, riotous. (Obedient, orderly.) **Mutual**, reciprocal, interchanged, correlative. (Sole, solitary.) **Mysterious**, dark, obscure, hidden, secret, dim, mystic, enigmatical, unaccountable. (Open, clear) **Mystify**, confuse, perplex, puzzle (Clear, explain.)

**NAKED**, nude, bare, uncovered, unclothed, rough, rude, simple. (Covered, clad.) **Name**, *v.*, denominate, entitle, style, designate, term, call, christen. **Name**, *n.*, appellation, designation, denomination, title, cognomen, reputation, character, fame, credit, repute. **Nar** ate, tell, relate, detail, recount, describe, enumerate, rehearse, recite. **Nasty**, filthy, foul, dirty, unclean, impure, indecent, gross, vile. **Nation**, people, community, realm, state. **Native**, indigenous, inborn, vernacular. **Natural** original, regular, normal, bastard. (Unnatural, forced.) **Near**, nigh, neighboring, close, adjacent, contiguous, intimate (Distant.) **Necessary**, needful, expedient, essential, requisite, indispensable (Useless) **Necessitate**, *v.*, compel, force, oblige. **Necessity**, need, occasion, exigency, emergency, urgency, requisite. **Need**, *n.*, necessity, distress, poverty, indigence, want, penury. **Need**, *v.*, require, want, lack. **Neglect**, *v.*, disregard, slight, omit, overlook. **Neglect**, *n.*, omission, failure, default, negligence, remissness, carelessness, slight. **Neighborhood**, environs, vicinity, nearness, adjacency, proximity. **Nervous**, timid, timorous, shaky. **New**, fresh, recent, novel. (Old.) **News**, tidings, intelligence, information. **Nice**, exact, accurate, good, particular, precise, fine, delicate. (Careless, coarse, unpleasant.) **Nimble**, active, brisk, lively, alert, quick, agile, prompt. (Awkward) **Nobility**, aristocracy, greatness, grandeur, peerage. **Noble**, exalted, elevated, illustrious, great, grand, lofty. (Low.) **Noise**, cry, outcry, clamor, row, din, uproar, tumult. (Silence.) **Nonsensical**, irrational, absurd, silly, foolish. (Sensible.) **Notable**, plain, evident, remarkable, signal, striking, rare. (Obscure.) **Note**, *s.*, token, symbol, mark, sign, indication, remark, comment. **Noted**, distinguished, remarkable, eminent, renowned. (Obscure.) **Notice**, *s.*, advice, notification, intelligence, information. **Notice**, *v.*, mark, note, observe, attend to, regard, heed. **Notify**, *v.*, publish, acquaint, apprise, inform, declare. **Notion**, conception, idea, belief, opinion, sentiment. **Nocturnal**, conspicuous, open, obvious, ill-famed. (Unknown.) **Nourish**, nurture, cherish, foster, supply. (Starve, famish.) **Nourishment**, food, diet, sustenance, nutrition. **Novel**, modern, new, fresh, recent, unused, strange, rare. (Old.) **Noxious**, hurtful, deadly, poisonous, deleterious, baneful. (Beneficial.) **Nullify**, annul, vacate, invalidate, quash, cancel, repeal. (Affirm) **Nutrition**, food, diet, nutriment, nourishment.

**OBDURATE**, hard, callous, hardened, unfeeling, insensible (Yielding, tractable.) **Obedient**, compliant, submissive, dutiful, respectful. (Obstinate.) **Obese**, corpulent, fat, adipose, fleshy. (Attenuated.) **Obey**, *v.*, conform, comply, submit. (Rebel, disobey.) **Object**, *s.*, aim, end, purpose, design, mark, butt. **Object**, *v.*, oppose, except to, contravene, impeach, deprecate. (Assent.) **Obnoxious**, offensive. (Agreeable.) **Obscure**, undistinguished, unknown. (Distinguished.)

## SYNONYMS AND ANTONYMS.

**Obstinate**, contumacious, headstrong, stubborn, obdurate. (Yielding.) **Occasion**, opportunity. **Offense**, affront, misdeed, misdemeanor, transgression, trespass. **Offensive**, insolent, abusive, obnoxious. (Inoffensive.) **Office**, charge, function, place. **Offspring**, issue, progeny. **Old**, aged, superannuated, ancient, antique, antiquated, obsolete, old-fashioned. (Young, new.) **Omen**, presage, prognostic. **Opaque**, dark. (Bright, transparent.) **Open**, candid, unserved, clear, fair. (Hidden, dark.) **Opinion**, notion, view, judgment, belief, sentiment. **Opinionated**, conceited, egotistical. (Modest.) **Oppose**, resist, withstand, thwart. (Give way.) **Option**, choice. **Order**, method, rule, system, regularity. (Disorder.) **Origin**, cause, occasion, beginning, source. (End.) **Outlive**, survive. **Outward**, external, outside, exterior. (Inner.) **Over**, above. (Under.) **Overbalance**, outweigh, preponderate. **Overbear**, bear down, overwhelm, overpower, subdue. **Overbearing**, haughty, arrogant, proud. (Gentle.) **Overflow**, inundation, deluge. **Overrule**, supersede, suppress. **Overspread**, overrun, ravage. **Overturn**, invert, overthrow, reverse, subvert. (Establish, fortify.) **Overwhelm**, crush, defeat, vanquish.

**PAIN**, suffering, qualm, pang, agony, anguish. (Pleasure.) **Pallid**, pale, wan. (Florid.) **Part**, division, portion, share, fraction. (Whole.) **Particular**, exact, distinct, odd, singular, strange. (General.) **Patient**, passive, submissive, meek. (Obdurate.) **Peace**, calm, quiet, tranquillity. (War, riot, trouble, turbulence.) **Peaceable**, pacific, peaceful, quiet. (Troublesome, riotous.) **Penetrate**, bore, pierce, perforate. **Penetration**, acuteness, sagacity. (Dullness.) **People**, nation, persons, folks. **Perceive**, note, observe, discern, distinguish. **Perception**, conception, notion, idea. **Peril**, danger, pitfall, snare. (Safety.) **Permit**, allow, tolerate. (Forbid.) **Persuade**, allure, entice, prevail upon. **Physical**, corporeal, bodily, material. (Mental.) **Picture**, engraving, print, representation, illustration, image. **Piteous**, doleful, woful, rueful. (Joyful.) **Pitiless**, see merciless. **Pity**, compassion, sympathy. (Cruelty.) **Place**, *n.*, spot, site, position, post, situation, station. **Place**, *v.*, order, dispose. **Plain**, open, manifest, evident. (Secret.) **Play**, game, sport, amusement. (Work.) **Pleace**, gratify, pacify. (Displease.) **Pleasure**, charm, delight, joy. (Pain.) **Plentiful**, abundant, ample, copious, plenteous. (Scarce.) **Poise**, balance. **Positive**, absolute, peremptory, decided, certain. (Negative.) **Possessor**, owner, master, proprietor. **Possible**, practical, practicable. (Impossible.) **Poverty**, penury, indigence, need, want. (Wealth.) **Power**, authority, force, strength, dominion. **Powerful**, mighty, potent. (Weak.) **Praise**, commend, extol, laud. (Blame.) **Prayer**, entreaty, petition, request, suit. **Pretense**, *n.*, pretext, subterfuge. **Prevailing**, predominant, prevalent, general. (Isolated, sporadic.) **Prevent**, *v.*, obviate, preclude. **Previous**, antecedent, introductory, preparatory, preliminary. (Subsequent.) **Pride**, vanity, conceit. (Humility.) **Principally**, chiefly, essentially, mainly. **Principle**, ground, reason, motive, impulse, maxim, rule, rectitude, integrity. **Privilege**, immunity, advantage, favor, prerogative, exemption, right, claim. **Probity**, rectitude, uprightness, honesty, integrity, sincerity, soundness. (Dishonesty.) **Problematical**, uncertain, doubtful, dubious, questionable, disputable, suspicious. (Certain.) **Prodigious**, huge, enormous, vast, amazing, astonishing, astounding, surprising, remarkable, wonderful. (Insignificant.) **Profession**, business, trade, occupation, vocation, office, employment, engagement, avowal. **Proffer**, volunteer, offer, propose, tender. **Profligate**, abandoned, dissolute, depraved, vicious, degenerate, corrupt, demoralized. (Virtuous.) **Profound**, deep, fathomless, penetrating, solemn, abstruse, recondite. (Shallow.) **Profuse**, extravagant, prodigal, lavish, improvident, excessive, copious, plentiful. (Succinct.) **Prolific**, productive, generative, fertile, fruitful, teeming. (Barren.) **Prolix**, diffuse, long, prolonged, tedious, tiresome, wordy, verbose, prosaic. (Concise, brief.) **Prominent**, eminent, conspicuous, marked, important, leading. (Obscure.) **Promiscuous**, mixed, unarranged, mingled, indiscriminate. (Select.) **Prompt**, see punctual. **Prop**, *v.*, maintain, sustain, support, stay. **Propagate**, spread, circulate, diffuse, disseminate, extend, breed, increase. (Suppress.) **Proper**, legitimate, right, just, fair, equitable, honest, suitable, fit, adapted, meet, becoming, befitting, decent, pertinent, appropriate. (Wrong.) **Prosper**, flourish, succeed, grow rich, thrive, advance. (Fail.) **Prosperity**, well-being, weal, welfare, happiness, good luck. (Poverty.) **Proxy**, agent, representative, substitute,

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delegate, deputy. **Prudence**, carefulness, judgment, discretion, wisdom. (Indiscretion.) **Prurient**, itching, craving, hankering, longing. **Puerile**, youthful, juvenile, boyish, childish, infantile, trifling, weak, silly. (Mature.) **Punctilious**, nice, particular, formal, precise (Negligent.) **Punctual**, exact, precise, nice, particular, prompt, timely. (Dilatory.) **Putrefy**, rot, decompose, corrupt, decay. **Puzzle**, *v.*, perplex, confound, embarrass, bewilder, confuse, pose, mystify. (Enlighten.)

**QUACK**, impostor, pretender, charlatan, empiric, mountebank. (Savant) **Quaint**, artful, curious, far-fetched, fanciful, odd, singular. **Qualified**, competent, fitted, adapted. (Incompetent.) **Quality**, attribute, rank, distinction. **Querulous**, doubting, complaining, fretting, repining. (Patient.) **Question**, query, inquiry, interrogatory. **Quibble**, cavil, evade, equivocate, shuffle, prevaricate. **Quick**, lively, ready, prompt, alert, nimble, agile, active, brisk, expeditious, adroit, fleet, rapid, swift, impetuous, sweeping, dashing, clever, sharp. (Slow.) **Quote**, note, repeat, cite, adduce.

**RABID**, mad, furious, raging, frantic. (Rational.) **Race**, course, match, pursuit, career, family, clan, house, ancestry, lineage, pedigree. **Rack**, agonize, wring, torture, excruciate, distress, harass. (Soothe.) **Racy**, spicy, pungent, smart, spirited, lively, vivacious. (Dull, insipid.) **Radiance**, splendor, brightness, brilliance, brilliancy, lustre, glare. (Dullness.) **Radical**, organic, innate, fundamental, original, constitutional, inherent, complete, entire. (Superficial. In a political sense, uncompromising; antonym, moderate.) **Rancid**, fetid, rank, stinking, sour, tainted, reasty. (Fresh, sweet.) **Rancor**, malignity, hatred, hostility, antipathy, animosity, enmity, ill-will, spite. (Forgiveness.) **Rank**, order, degree, dignity, nobility, consideration. **Ransack**, rummage, pillage, overhaul, explore, plunder. **Ransom**, emancipate, free, unfetter. **Rant**, bombast, fustian, cant. **Rapacious**, ravenous, voracious, greedy, grasping. (Generous.) **Rapt**, ecstatic, transported, ravished, entranced, charmed. (Distracted.) **Rapture**, ecstasy, transport, delight, bliss. (Dejection.) **Rare**, scarce, singular, uncommon, unique. **Rascal**, scoundrel, rogue, knave, scamp, vagabond. **Rash**, hasty, precipitate, foolhardy, adventurous, heedless, reckless, careless. (Deliberate.) **Rate**, value, compute, appraise, estimate, chide, abuse. **Ratify**, confirm, establish, substantiate, sanction. (Protest oppose.) **Rational**, reasonable, sagacious, judicious, wise, sensible, sound. (Unreasonable.) **Ravage**, overrun, overspread, desolate, despoil, destroy. **Ravish**, enrapture, enchant, charm, delight abuse. **Raze**, demolish, destroy, overthrow, ruin, dismantle (Build up.) **Reach**, touch, stretch, attain, gain, arrive at. **Ready**, prepared, ripe, apt, prompt, adroit, handy. (Slow, dilatory.) **Real**, actual, literal, practical, positive, certain, genuine, true. (Unreal.) **Realize**, accomplish, achieve, effect, gain, get, acquire, comprehend. **Reap**, gain, get, acquire, obtain. **Reason**, motive, design end, proof, cause, ground, purpose. **Reason**, deduce, draw from, trace, infer, conclude. **Reasonable**, rational, wise, honest, fair, right, just. (Unreasonable.) **Rebellion**, insurrection, revolt. **Recant**, recall, abjure, retract, revoke. **Recede**, retire, retreat, withdraw, ebb. **Receive**, accept, take, admit, entertain. **Reception**, receiving, levee, receipt, admission. **Recess**, retreat, depth, niche, vacation, intermission. **Recreation**, sport, pastime, play, amusement, game, fun. **Redeem**, ransom, recover, rescue, deliver, save, free. **Redress**, remedy, repair, remission, abatement, relief. **Reduce**, abate, lessen, decrease, lower, shorten, conquer. **Refined**, polite, courtly, polished, cultured, genteel, purified. (Boorish.) **Reflect**, consider, cogitate, think, ponder, muse, censure. **Reform**, amend, correct, better, restore, improve. (Corrupt) **Reformation**, improvement, reform, amendment. (Corruption.) **Refuge**, asylum, protection, harbor, shelter, retreat. **Refuse**, *v.*, deny, reject, repudiate, decline, withhold. (Accept.) **Refuse**, *s.*, dregs, dross, scum, rubbish, leavings, remains. **Refute**, disprove, falsify, negative. (Affirm.) **Regard**, *v.*, mind, heed, notice, behold, view, consider, respect. **Regret**, *s.*, grief, sorrow, lamentation, repentance, remorse. **Regular**, orderly, uniform, customary, ordinary, stated. (Irregular.) **Regulate**, methodize, arrange, adjust, organize, govern, rule. (Disorder.) **Reimburse**, refund, repay, satisfy, indemnify. **Relevant**, fit, proper, suitable, appropriate, pertinent, apt. (Irrelevant.) **Reliance**, trust, hope, dependence, confidence. (Suspicion.) **Relief**, succor, aid,

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help, redress, alleviation. **Relinquish**, give up, forsake, resign, surrender, quit, leave, forego. (Retain.) **Remedy**, help, relief, redress, cure, specific, reparation. **Remorseless** pitiless, relentless, cruel, ruthless, merciless, barbarous. (Merciful, humane.) **Remote**, distant, far, secluded, indirect. (Near.) **Reproduce**, propagate, imitate, represent, copy. **Repudiate**, disown, discord, disavow, renounce, disclaim. (Acknowledge.) **Repugnant**, antagonistic, distasteful. (Agreeable.) **Repulsive**, forbidding, odious, ugly, disagreeable, revolting. (Attractive.) **Respite**, reprieve, interval, stop, pause. **Revenge**, vengeance, retaliation, requital, retribution. (Forgiveness.) **Revenue**, produce, income, fruits, proceeds, wealth. **Reverence**, *n.*, honor, respect, awe, veneration, deference, worship, homage. (Execration.) **Revise**, review, reconsider. **Revive**, refresh, renew, renovate, animate, resuscitate, vivify, cheer, comfort. **Rich**, wealthy, affluent, opulent, copious, ample, abundant, exuberant, plentiful, fertile, fruitful, superb, gorgeous. (Poor.) **Rival**, *n.*, antagonist, opponent, competitor. **Road**, way, highway, route, course, path, pathway, anchorage. **Roam**, ramble, rove, wander, stray, stroll. **Robust**, strong, lusty, vigorous, sinewy, stout, sturdy, stalwart, able-bodied. (Puny.) **Rout**, *v.*, discomfit, beat, defeat, overthrow, scatter. **Route**, road, course, march, way, journey, path, direction. **Rude** rugged, rough, uncouth, unpolished, harsh, gruff, impertinent, saucy, flippant, impudent, insolent, churlish. (Polished, polite.) **Rule**, sway, method, system, law, maxim, precept, guide, formula, regulation, government, standard, test. **Rumor**, hearsay, talk, fame, report, bruit. **Ruthless**, cruel, savage, barbarous, inhuman, merciless, remorseless, relentless, unrelenting. (Considerate.)

**SACRED**, holy, hallowed, divine, consecrated, dedicated, devoted. (Profane.) **Safe**, secure, harmless, trustworthy, reliable. (Perilous, dangerous.) **Sanction**, confirm, countenance, encourage, support, ratify, authorize. (Disapprove.) **Sane**, sober, lucid, sound, rational. (Crazy.) **Saucy**, impertinent, rude, impudent, insolent, flippant, forward. (Modest.) **Scandalize**, shock, disgust, offend, calumniate, vilify, revile, malign, traduce, defame, slander. **Scanty**, bare, pinched, insufficient, slender, meager. (Ample.) **Scatter**, strew, spread, disseminate, disperse, dissipate, dispel. (Collect.) **Secret**, clandestine, concealed, hidden, sly, underhand, latent, private. (Open.) **Seduce**, allure, attract, decoy, entice, abduct, inveigle, deprave. **Sense**, discernment, appreciation, view, opinion, feeling, perception, sensibility, susceptibility, thought, judgment, signification, import, significance, meaning, purport, wisdom. **Sensible**, wise, intelligent, reasonable, sober, sound, conscious, aware. (Foolish.) **Settle**, arrange, adjust, regulate, conclude, determine. **Several**, sundry, divers, various, many. **Severe**, harsh, stern, stringent, unmitigated, rough, unyielding. (Lenient.) **Shake**, tremble, shudder, shiver, quake, quiver. **Shallow**, superficial, flimsy, slight. (Deep, thorough.) **Shame**, disgrace, dishonor. (Honor.) **Shameful**, degrading, scandalous, disgraceful, outrageous. (Honorable.) **Shameless**, immodest, impudent, indecent, indelicate, brazen. **Shape**, form, fashion, mold, model. **Share**, portion, lot, division, quantity, quota, contingent. **Sharp**, acute, keen. (Dull.) **Shine**, glare, glitter, radiate, sparkle. **Short**, brief, concise, succinct, summary. (Long.) **Show**, *v.*, indicate, mark, point out, exhibit, display. **Show**, *n.*, exhibition, representation, sight, spectacle. **Sick**, diseased, sickly, unhealthy, morbid. (Healthy.) **Sickness**, *n.*, illness, indisposition, disease, disorder. (Health.) **Significant**, *a.*, expressive, material, important. (Insignificant.) **Signification**, import, meaning, sense. **Silence**, speechlessness, dumbness. (Noise.) **Silent**, dumb, mute, speechless. (Talkative.) **Simile**, comparison, similitude. **Simple**, single, uncompounded, artless, plain. (Complex, compound.) **Simulate**, dissimulate, dissemble, pretend. **Sincere**, candid, hearty, honest, pure, genuine, real. (Insincere.) **Situation**, condition, plight, predicament, state, position. **Size**, bulk, greatness, magnitude, dimension. **Slavery**, servitude, enthrallment, thralldom. (Freedom.) **Sleep**, doze, drowse, nap, slumber. **Sleepy**, somnolent. (Wakeful.) **Slow**, dilatory, tardy. (Fast.) **Smell**, fragrance, odor, perfume, scent. **Smooth**, even, level, mild. (Rough.) **Soak**, drench, imbue, steep. **Social**, sociable, friendly, communicative. (Unsocial.) **Soft**, gentle, meek, mild. (Hard.) **Solicit**, importune, urge. **Solitary**, sole, only, single. **Sorry**, grieved, poor, paltry, insignificant. (Glad, respectable.) **Soul**, mind, spirit. (Soul is opposed to body, mind to matter.) **Sound**, *v.*, healthy, sane. (Unsound.)

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**Sound**, *n.*, tone, noise, silence. **Space**, room. **Sparse**, scanty, thin. (**Luxuriant**.) **Speak**, converse, talk, confer, say, tell. **Special**, particular, specific. (**General**.) **Spend**, expend, exhaust, consume, waste, squander, dissipate. (**Save**.) **Sporadic**, isolated, rare. (**General**, prevalent.) **Spread**, disperse, diffuse, expand, disseminate, scatter. **Spring**, fountain, source. **Staff**, prop, support, stay. **Stagger**, reel, totter. **Stain**, soil, discolor, spot, sully, tarnish. **State**, commonwealth, realm. **Sterile**, barren, unfruitful. (**Fertile**.) **Stifle**, choke, suffocate, smother. **Stormy**, rough, boisterous, tempestuous. (**Calm**.) **Straight**, direct, right. (**Crooked**.) **Strait**, *a.*, narrow, confined. **Stranger**, alien, foreigner. (**Friend**.) **Strengthen**, fortify, invigorate. (**Weaken**.) **Strong**, robust, sturdy, powerful. (**Weak**.) **Stupid**, dull, foolish, obtuse, witless. (**Clever**.) **Subject**, exposed to, liable, obnoxious (**Exempt**) **Subject**, inferior, subordinate. (**Superior** to, above.) **Subsequent**, succeeding, following. (**Previous**.) **Substantial**, solid, durable. (**Unsubstantial**.) **Suit**, accord, agree. (**Disagree**.) **Superficial**, flimsy, shallow, untrustworthy. (**Thorough**.) **Superfluous**, unnecessary, excessive. (**Necessary**.) **Surround**, encircle, encompass, environ. **Sustain**, maintain, support. **Symmetry**, proportion. **Sympathy**, commiseration, compassion, condolence. **System**, method, plan, order. **Systematic**, orderly, regular, methodical. (**Chaotic**.)

**TAKE**, accept, receive. (**Give**.) **Talkative**, garrulous, loquacious, communicative. (**Silent**.) **Taste**, flavor, relish, savor. (**Tastlessness**.) **Tax**, custom, duty, impost, excise, toll. **Tax**, assessment, rate. **Tease**, taunt, tantalize, torment, vex. **Temporary**, *a.*, fleeting, transient, transitory. (**Permanent**.) **Tenacious**, pertinacious, retentive. **Tendency**, aim, drift, scope. **Tenet**, position, view, conviction, belief. **Term**, boundary, limit, period, time. **Territory**, dominion. **Thankful**, grateful, obliged. (**Thankless**.) **Thankless**, ungracious, profitless, ungrateful, unthankful. **Thaw**, melt, dissolve, liquefy. (**Freeze**.) **Theatrical**, dramatic, showy, ceremonious, meretricious. **Theft**, robbery, depredation, spoliation. **Theme**, subject, topic, text, essay. **Theory**, speculation, scheme, plea, hypothesis, conjecture. **Therefore**, accordingly, consequently, hence. **Thick**, dense, close, compact, solid, coagulated, muddy, turbid, misty, foggy, vaporous. (**Thin**.) **Thin**, slim, slender, slight, flimsy, lean, attenuated, scraggy. **Think**, cogitate, consider, reflect, ponder, contemplate, meditate, muse, conceive, fancy, imagine, apprehend, hold, esteem, reckon, consider, regard, deem, believe, opine. **Thorough**, accurate, correct, trustworthy, reliable, complete. (**Superficial**.) **Thought**, idea, conception, imagination, fancy, conceit, notion, supposition, care, provision, consideration, opinion, view, sentiment, reflection, deliberation. **Thoughtful**, considerate, careful, cautious, heedful, contemplative, reflective, provident, pensive, dreamy. (**Thoughtless**.) **Thoughtless**, inconsiderate, rash, precipitate, improvident, heedless. **Tie**, *v.*, bind, restrain, restrict, oblige, secure, unite, join. (**Loose**.) **Tie**, *n.*, band, ligament, ligature. **Time**, duration, season, period, era, age, date, span, spell. **Tolerate**, allow, admit, receive, suffer, permit, let, endure, abide. (**Oppose**.) **Top**, summit, apex, head, crown, surface. (**Bottom**, base.) **Torrid**, burning, hot, parching, scorching, sultry. **Tortuous**, twisted, winding, crooked, indirect. **Torture**, torment, anguish, agony. **Touching**, tender, affecting, moving, pathetic. **Tractable**, docile, manageable, amenable. **Trade**, traffic, commerce, dealing, occupation, employment, office. **Traditional**, oral uncertain, transmitted. **Traffic**, trade, exchange, commerce, intercourse. **Trammel**, *n.*, fetter, shackle, clog, bond, chain, impediment, hindrance. **Tranquil**, still untroubled, peaceful, quiet, hushed. (**Noisy**, boisterous.) **Transaction**, negotiation, occurrence, proceeding, affair. **Trash**, nonsense, twaddle, trifles, dross. **Travel**, trip, ramble, peregrination, excursion, journey, tour, voyage. **Treacherous**, traitorous, disloyal, treasonable, faithless, false-hearted, perfidious, sly, false. (**Trustworthy**, faithful.) **Trite**, stale, old, ordinary, commonplace, hackneyed. (**Novel**.) **Triumph**, achievement, ovation, victory, conquest, jubilation. (**Failure**, defeat.) **Trivial**, trifling, petty, small, frivolous, unimportant, insignificant. (**Important**.) **True**, genuine, actual, sincere, unaffected, true-hearted, honest, upright, veritable, real, veracious, authentic, exact, accurate, correct. **Tumultuous**, turbulent, riotous, disorderly, disturbed, confused, unruly. (**Orderly**.) **Tune**, tone, air, melody, strain. **Turbid**, foul, thick,

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muddy, impure, unsettled. (Placid.) **Type**, emblem, symbol, figure, sign, kind, sort, letter. **Tyro**, novice, beginner, learner.

**UGLY**, unsightly, plain, homely, ill-favored, hideous. (Beautiful.) **Umbrage**, offence, dissatisfaction, displeasure, resentment. **Umpire**, referee, arbitrator, judge, arbiter. **Unanimity**, accord, agreement, unity, concord. (Discord.) **Unanimous**, agreeing, like-minded. **Unbridled**, wanton, licentious, dissolute, loose, lax. **Uncertain**, doubtful, dubious, questionable, fitful, equivocal, ambiguous, indistinct, variable, fluctuating. **Uncivil**, rude, discourteous, disrespectful, disobliging. (Civil.) **Unclean**, dirty, foul, filthy, sullied. (Clean.) **Uncommon**, rare, strange, scarce, singular, choice. (Common, ordinary.) **Unconcerned**, careless, indifferent, apathetic. (Anxious.) **Uncouth**, strange, odd, clumsy, ungainly. (Graceful.) **Uncover**, reveal, strip, expose, lay bare, divest. (Hide.) **Under**, below, underneath, beneath, subordinate, lower, inferior. (Above.) **Understanding**, knowledge, intellect, intelligence, faculty, comprehension, mind, reason, brains. **Undertake**, engage in, embark in, agree, promise. **Undo**, annul, frustrate, untie, unfasten, destroy. **Uneasy**, restless, disturbed, unquiet, stiff, awkward. (Quiet.) **Unequal**, uneven, not alike, irregular, insufficient. (Even.) **Unequaled**, matchless, unique, novel, new, unheard of. **Unfair**, wrongful, dishonest, unjust. (Fair.) **Unfit**, *a.*, improper, unsuitable, inconsistent, untimely, incompetent. (Fit) **Unfit**, *v.*, disable, incapacitate, disqualify. (Fit.) **Unfortunate**, calamitous, ill-fated, unlucky, wretched, unhappy, miserable. (Fortunate.) **Ungainly**, clumsy, awkward, lumbering, uncouth. (Pretty.) **Unhappy**, miserable, wretched, distressed, afflicted, painful, disastrous, drear, dismal. (Happy.) **Uniform**, regular, symmetrical, equal, even, alike, unvaried. (Irregular.) **Uninterrupted**, continuous, perpetual, unceasing, incessant, endless. (Intermittent.) **Union**, junction, combination, alliance, confederacy, league, coalition, agreement, concert. (Disunion, separation.) **Unique**, unequal, uncommon, rare, choice, matchless. (Common, ordinary.) **Unite**, join, conjoin, combine, concert, add, attach, incorporate, embody, clench, merge. (Separate, disrupt, sunder.) **Universal**, general, all, entire, total, catholic. (Sectional.) **Unlimited**, absolute, undefined, boundless, infinite. (Limited.) **Unreasonable**, foolish, silly, absurd, preposterous, ridiculous. **Unrivaled**, unequaled, unique, unexampled, incomparable, matchless. (Mediocre.) **Unroll**, unfold, open, discover. **Unruly**, ungovernable, unmanageable, refractory. (Tractable, docile.) **Unusual**, rare, unwonted, singular, uncommon, remarkable, strange, extraordinary. (Common.) **Uphold**, maintain, defend, sustain, support, vindicate. (Desert, abandon.) **Upright**, vertical, perpendicular, erect, just, equitable, fair, pure, honorable. (Pronc, horizontal.) **Uprightness**, honesty, integrity, fairness, goodness, probity, virtue, honor. (Dishonesty.) **Urge**, incite, impel, push, drive, instigate, stimulate, press, induce, solicit. **Urgent**, pressing, important, imperative, immediate, serious, wanted. (Unimportant.) **Usage**, custom, fashion, practice, prescription. **Use**, *n.*, usage, practice, habit, custom, avail, advantage, utility, benefit, application. (Disuse, desuetude.) **Use**, *v.*, employ, exercise, occupy, practise, accustom, inure. (Abuse.) **Useful**, advantageous, serviceable, available, helpful, beneficial, good. (Useless.) **Useless**, unserviceable, fruitless, idle, profitless (Useful.) **Usual**, ordinary, common, accustomed; habitual wonted, customary, general. (Unusual.) **Usurp**, arrogate, seize, appropriate assume. **Utmost**, farthest, remotest, uttermost, greatest. **Utter**, *a.*, extreme, excessive, sheer, mere, pure. **Utter**, *v.*, speak, articulate, pronounce, express, issue. **Utterly**, totally, completely, wholly, quite, altogether, entirely.

**VAOANT**, empty, unfilled, unoccupied, thoughtless, unthinking. (Occupied.) **Vagrant**, *n.*, wanderer, beggar, tramp, vagabond, rogue. **Vague**, unsettled, undetermined, uncertain, pointless, indefinite. (Definite.) **Vain**, useless, fruitless, empty, worthless, inflated, proud, conceited, unreal, unavailing. (Effectual, humble, real.) **Valiant**, brave, bold, valorous, courageous, gallant. (Cowardly.) **Valid**, weighty, strong, powerful, sound, binding, efficient. (Invalid.) **Valor**, courage, gallantry, boldness, bravery, heroism. (Cowardice.) **Value**, *v.*, appraise, assess, reckon, appreciate, estimate, prize, esteem, treasure. (Despise, condemn.) **Vanish**, disappear, fade, melt, dissolve. **Vanity**, emptiness, conceit, self-conceit, affectedness. **Vapid**, dull, flat, insipid, stale, tame. (Sparkling.) **Vapor**, fume,

## SYNONYMS AND ANTONYMS.

smoke, mist, fog, steam. **Variable**, changeable, unsteady, inconstant, shifting, wavering, fickle, restless, fitful. (Constant.) **Variety**, difference, diversity, change, diversification, mixture, medley, miscellany. (Sameness, monotony) **Vast**, spacious, boundless, mighty, enormous, immense, colossal, gigantic, huge, prodigious. (Confined.) **Vaunt**, boast, brag, puff, hawk, advertise, flourish, parade. **Venerable**, grave, sage, wise, old, reverend. **Venial**, pardonable, excusable, justifiable. (Grave, serious.) **Venom**, poison, virus, spite, malice, malignity. **Venture**, *v.*, speculation, chance, peril, stake. **Venture**, *v.*, dare, adventure, risk, hazard, jeopardize. **Veracity**, truth, truthfulness, credibility, accuracy (Falsehood.) **Verbal**, oral, spoken, literal, parole, unwritten. **Verdict**, judgment, finding, decision, answer. **Vexation**, chagrin, mortification (Pleasure) **Vibrate**, oscillate, swing, sway, wave, undulate, thrill. **Vice**, vileness, corruption, depravity, pollution, immorality, wickedness, guilt, iniquity, crime. (Virtue.) **Vicious**, corrupt, depraved, debased, bad, contrary, unruly, demoralized, profligate, faulty. (Virtuous, gentle.) **Victim**, sacrifice, food, prey, sufferer, dupe, gull. **Victuals**, viands, bread, meat, provisions, fare, food, repast. **View**, prospect, survey. **Violent**, boisterous, furious, impetuous, vehement. (Gentle.) **Virtuous**, upright, honest, moral. (Profligate.) **Vision**, apparition, ghost, phantom, spectre. **Voluptuary**, epicure, sensualist. **Vote**, suffrage, voice. **Vouch**, affirm, asseverate, assure, aver.

**WAIT**, await, expect, look for, wait for. **Wakeful**, vigilant, watchful. (Sleepy.) **Wander**, range, ramble, roam, rove, stroll. **Want**, lack, need. (Abundance.) **Wary**, circumspect, cautious. (Foolhardy.) **Wash**, clean, rinse, wet, moisten, stain, tint. **Waste**, *v.*, squander, dissipate, lavish, destroy, decay, dwindle, wither. **Wasteful**, extravagant, profligate. (Economical) **Way**, method, plan, system, means, manner, mode, form, fashion, course, process, road, route, track, path, habit, practice. **Wave**, breaker, billow, surge. **Weak**, feeble, infirm. (Strong.) **Weaken**, debilitate, enfeeble, enervate, invalidate. (Strengthen.) **Wearisome**, tedious, tiresome. (Interesting, enterprising) **Weary**, harass, jade, tire, fatigue. (Refresh) **Weight**, gravity, heaviness. (Lightness) **Weight**, burden, load. **Well-being**, happiness, prosperity, welfare. **Whole**, entire, complete, total, integral. (Part.) **Wicked**, iniquitous, nefarious. (Virtuous) **Will**, wish, desire. **Willingly**, spontaneously, voluntarily. (Unwillingly.) **Win**, get, obtain, gain, procure, effect, realize, accomplish, achieve. (Lose.) **Winning**, attractive, charming, fascinating, bewitching, enchanting, dazzling, brilliant. (Repulsive.) **Wisdom**, prudence, foresight, far-sightedness, sagacity. (Foolishness.) **Wit**, humor, satire, fun, raillery. **Wonder**, *v.*, admire, amaze, astonish, surprise. **Wonder**, *n.*, marvel, miracle, prodigy. **Word**, *n.*, expression, term. **Work**, labor, task, toil. (Play.) **Worthless**, valueless. (Valuable.) **Writer**, author, penman. **Wrong**, injustice, injury. (Right)

**YAWN**, gape, open wide. **Yearn**, hanker after, long for, desire, crave. **Yell**, bellow, cry out, scream. **Yellow**, golden, saffron-like. **Yelp**, bark, sharp cry, howl. **Yet**, besides, nevertheless, notwithstanding, however, still, ultimately, at last, so far, thus far. **Yield**, bear, give, afford, impart, communicate, confer, bestow, abdicate, resign, cede, surrender, relinquish, relax, quit, forego, give up, let go, waive, comply, accede, assent, acquiesce, succumb, submit. **Yielding**, supple, pliant, bending, compliant, submissive, unresisting. (Obstinate.) **Yoke**, *v.*, couple, link, connect. **Yore**, long ago, long since. **Young**, juvenile, inexperienced, ignorant, youthful. **Youth**, boy, lad, minority, adolescence, juvenility. **Youthful**, young, juvenile, boyish, girlish, puerile. (Old)

**ZEAL**, energy, fervor, ardor, earnestness, enthusiasm, eagerness. (Indifference.) **Zealous**, warm, ardent, fervent, enthusiastic, anxious. (Indifferent, careless.) **Zest**, relish, gusto, flavor. (Disgust.)

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**LEAD** in the form of filings, under a pressure of 2,000 atmospheres, or thirteen tons to the square inch, becomes compressed into a solid block, in which it is impossible to detect the slightest vestige of the original grains. Under a pressure of 5,000 atmospheres it liquefies.

# THE WORLD AND THE UNIVERSE.

## Facts Astronomical, Geographical, Historical and Statistical.

ACCORDING to the System of Copernicus (*b.* 1473), the Sun was regarded as the center of the universe. The planets, Mercury, Venus, the Earth, Mars, Jupiter, and Saturn, revolved round it in circular orbits; the Moon was a satellite of the Earth, spun round it as a center, and accompanied it on its annual rotation round the Sun. Since then this view has been firmly established in its main principles, but it is now known that the Sun itself moves steadily toward the constellation Hercules, and that it is by no means the largest body in the universe. The Solar System is known to consist of a central Sun, round which all the other members revolve. These consist of eight *primary* planets, viz.: Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, and Neptune; twenty *secondary* planets, *satellites*, or attendants upon the planets, of which the Earth has one, Mars two, Jupiter four, Saturn eight, Uranus four, and Neptune one; a number of minor planets or *asteroids* situated between Mars and Jupiter, of which 271 are known; several comets, and a great number of small meteoric bodies.

In their broad general features the planets are all alike. The ball or globe-like form is peculiar to all of them, they are all dark bodies, deriving light and heat from the sun, and consequently they all reflect the same borrowed light. In common, they all perform two motions, the one a spinning or rotatory motion on an axis, the other a motion of translation, which whirls them round the sun. Both these motions are from west to east, and the orbits which they describe round the sun are not circular, as represented by the Copernican System, but assume more the form of an oval or *ellipse*.

## SOME ELEMENTS OF THE PLANETARY SYSTEM.

Names of the Planets.	Diameter in miles.	Periodic time. Days.	Dis. from the Sun. Miles.	Revolves on its Axis.	Moves in its Orbit per hour.
Mercury	3,200	88	37 Mill.	24 h. 5 m	110,000 Miles
Venus	7,700	224.7	69 "	23 h. 21 m	83,000 "
Earth	7,916	365 $\frac{1}{4}$	95 "	23 h. 56 m	68,000 "
Mars	4,200	687	145 "	24 h. 39 m	54,000 "
Jupiter	88,000	4,332 $\frac{1}{2}$	494 "	9 h. 56 m	30,000 "
Saturn	75,000	10,759	906 "	10 h. 29 m	22,000 "
Uranus	35,000	30,687	1,822 "	Unknown	15,000 "
Neptune	38,000	60,127	2,853 "	"	12,000 "
Moon	2,180	Dist. from Earth, 238,000 miles.			2,280 "
Sun	887,000	1,400,000 times larger than Earth			Unknown.



## THE WORLD AND THE UNIVERSE.

The circumference of the earth is measured in this way : Suppose two astronomers, A and B, stationed on the same meridian, a certain distance apart, and with accurate instruments, should make careful observations on a certain star at the moment it crossed the meridian ; and A should find the star 16 degrees south of the zenith, and B, who is exactly 415 miles south of A, should find it only 10 degrees south of the zenith ; there would then be a difference of 6 degrees between the two places ; and as they are 415 miles apart, *one* degree must be 1-6th of 415 or 69 1-6th miles.

Now, if 1 degree, which is the 360th part of the earth's circumference, is 69 1-6th miles, the whole circumference must be 360 times 69 1-6th, or 24,900 miles.

It is in this manner that the earth's magnitude is computed very accurately.

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THE NEBULAR HYPOTHESIS, now generally accepted by scientists as explaining, as far as possible by human conception, the genesis of the heavenly bodies, was first suggested by Herschel, and developed by Laplace. It assumes that the solar system was once an enormous mass of gaseous substance. Rapid rotation being set up in this gaseous mass, it took the form of a disc, and at last, centrifugal force overcoming cohesion, whole rings and fragments flew off from this disc, and by centripetal force contracted into spheroid masses. As in the original mass, the velocity of the outer circle of each body thrown off is greater than the inner circle, and this causes each spheroid to revolve on its own axis. This process goes on, and the central mass continues to cool and shrink, until we have at last a central body with a number of smaller spheroidal bodies revolving around it in orbits the smaller the nearer they are to the central orb. Certain points are assumed in this hypothesis to explain the distribution of matter in our solar system. It is assumed that in the throwing off of great masses from the central disk, immense quantities of minute particles were also thrown, which continued to revolve, in the same plane with the large mass, around the center body. By slow degrees these minute atoms, by the law of gravitation, were aggregated into the mass nearest to them. These subordinate aggregations would form with most difficulty nearest the large central mass, because of the superior attractive force of the latter, wherefore the interior planets—Mercury, Venus, the Earth, Mars—are smaller than the two great orbs in the zone beyond them. These two enormous planets, Jupiter and Saturn, occupy the space where conditions are most favorable to subordinate aggregations, but, beyond them, the gravity of aggregating material becomes reduced, and so the planets found in the

## THE WORLD AND THE UNIVERSE.

outer zone, Uranus and Neptune, are smaller than the planets of the middle zone.

### Our Globe and Its Inhabitants.

The three primary divisions of man, as indicated by Latham, are the Indo-European, the Mongolian, and the African.

I. THE INDO-EUROPEAN OR CAUCASIC race originally extended from India across Europe, and increasing ever in civilization and intellectual power from age to age, has become the dominant one in the world, extending its influence to every part of the earth, supplanting many inferior races, and repeopleing wide areas, as in America and Australia.

The Caucasian race comprises two principal branches—the Aryan and the Semitic. A third branch, according to M. de Quatrefages, includes the Caucasians proper, Euscarians (Basques), and others.

Most of the inhabitants of Europe belong to the Aryan Family; they are arranged in the following groups:

1. The Keltic, in the N. W., comprising the Welsh, Gaels, Erse, Manx, and Armoricans.
2. The Italic, chiefly in the S. W. and S., comprising the Italians and other Romance nations—French, Spanish, Portuguese, Roumanesch, and Roumanians.
3. The Thraco-Hellenic, in the S. E., Greeks and Albanians.
4. The Teutonic, in the N. N. W., and center, comprising the Germans, Scandinavians, Danes, Icelanders, Dutch, Flemings, English.
5. The Lithuanian, S. E. of the Baltic.
6. The Slavonic, in the E., comprising the Russians, Poles, Tsekhs, Serbs, Croats, Bulgarians, etc.

The Indo-European or Caucasian race in Asia comprises the Hindus, Baluchis, Afghans, Iranians (Persia), Galchas (Zarafshan), and the Semitic tribes of Armenia, Syria, Arabia, etc.

II. THE MONGOLIAN is divisible into three branches, according to geographical position, which again form numerous smaller families.

1. The Asiatic, comprising the Mongolians of the Chinese Empire, India, and Indo-China; the Kalmucks, adjoining the Turks, who extend from Southern Europe far into Central Asia; The Magyars of Hungary; the Yakuts and Samoeids (or Samoyedes) of Siberia; with the Lapps, Finns, and various tribes of East Europe.

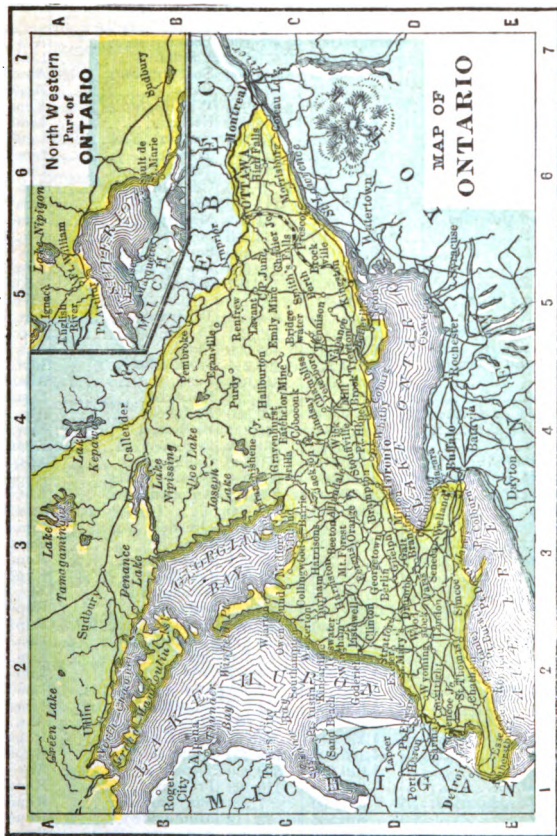
2. The Oceanic Mongolians are composed of two classes. I. The black-skinned, found in New Guinea, Australia, Tasmania, and the islands between New Zealand and New Caledonia. II. The yellow, olive or brown race, occupying New Zealand, the Malay Peninsula, Sumatra, Borneo, Java, Moluccas, Philippines, Madagascar, etc.

3. The American Mongolians comprise a large number of tribes, the chief of which in North America are—the Athabaskans, Algonkins, Sioux, Paducas, and Mexicans. In South America the Quichuas, Chilians, and Patagonians extend along the west coast. The Caribs, Maypures, Brazilians, Moxos, and Chiquitos occupy the north, east, and center of the continent. The Eskimos form a connecting link between the Asiatic and American branches of this family.

III. THE AFRICAN, forming the third great division of the human race, is exhibited in its purest form by the natives of Western Africa. The Negroes occupy the whole central portion of the country from Cape Verd on the west to Khartoom on the east, and south to the Congo. South of the Negroes are the Bantus (including the Kafirs), inhabiting the greater part of Africa between the 4th parallel of N. lat. and the Cape. In the S. W. are the Hottentots. Certain dwarfish tribes are found in different parts of the continent, as the Bushmen of the Kalahari Desert, the Obongo of the Ogowe basin, and others. The Fulas and Nubas occupy parts of the Soudan; the former, in the N. W., extend from the Senegal and Niger towards Lake Tchad; the latter are found in Nubia, Kordofan, Darfur, etc. The Gallas, Copts, Somali, of the Sahara, Egypt, and East Africa; the Abyssinians; and the Berbers, Kabyles, Tuareks and other tribes of North Africa, belong to the Hamitic race, which is closely allied to the Semitic race. The latter is represented by the Arabs of the N. coast, and of the Arabian Peninsula, and by the Tigres and other tribes of Abyssinia.



"The New World," as the great continents of the Western Hemisphere are called, was first opened to Christian civilization by the discovery of Columbus in 1492. The various countries are all concisely described elsewhere. Area of North America, 8,075,000 sq. miles; South America, 7,535,000 sq. miles. The entire population in 1880 was about 105,000,000.



**ONTARIO** is the most important province of Canada. Principal products: grain, fruit, lumber, petroleum, copper and iron. Its population, largely of British descent, is one-third of the whole Dominion. Toronto, the capital, is the manufacturing and educational center.

# THE WORLD'S PRINCIPAL COUNTRIES.

COUNTRIES.	Population	Sq. Miles.	Capitals.	Governm't
China .....	403,000,000	4,469,200	Pekin.....	Abs Desp
British Empire.....	320,676,000	9,079,711	London.....	Lim. Mon
Russian Empire.....	102,970,000	8,644,100	St. Petersburg.....	Abs Mon
France and Colonies.....	63,672,048	970,477	Paris.....	Republic
United States.....	*60,000,000	3,602,990	Washington.....	Republic
German Empire.....	46,852,450	212,028	Berlin.....	Lim. Mon
Austro-Hung. Empire.....	39,206,052	261,591	Vienna.....	Lim. Mon
Japan.....	36,700,118	147,669	Tokio.....	Lim. Mon
Holland and Colonies.....	33,042,238	778,187	The Hague.....	Lim. Mon
Turkish Empire.....	32,000,000	1,731,280	Constant nople.....	Abs. Mon
Italy.....	29,699,785	111,410	Rome.....	Lim. Mon
Spain and Colonies.....	24,873,621	361,953	Madrid.....	Lim. Mon
Sokoto.....	12,600,000	178,000	Sokoto.....	Abs. Desp
Corea.....	10,519,000	91,430	Seul.....	Abs Desp
Brazil.....	10,200,000	3,219,000	Rio de Janeiro.....	Lim. Mon
Mexico.....	10,007,000	751,177	Mexico.....	Republic
Congo Free State.....	8,000,000		Free State.....	Free State
Persia.....	7,653,600	636,060	Teheran.....	Abs. Desp
Portugal and Colonies.....	7,249,050	240,691	Lisbon.....	Lim. Mon
Egypt†.....	6,806,381	494,000	Cairo.....	Abs. Mon
Sweden and Norway.....	6,554,448	295,714	Stockholm.....	Lim. Mon
Morocco.....	6,500,000	314,000	Fez.....	Abs. Desp
Belgium.....	5,853,278	11,373	Brussels.....	Lim. Mon
Siam.....	5,700,000	280,550	Bangkok.....	Abs. Desp
Roumania†.....	5,376,000	46,314	Bucharest.....	Lim. Mon
Colombia.....	4,060,000	331,420	Bogota.....	Republic
Afghanistan.....	4,000,000	279,000	Cabul.....	Abs. Desp
Argentine Republic.....	3,026,000	609,386	Buenos Ayres.....	Republic
Madagascar.....	3,000,000	228,570	Antananarivo.....	Abs. Desp
Abyssinia.....	3,000,000	129,000		Abs. Desp
Saxony†.....	2,972,805	5,789	Dresden.....	Lim. Mon
Peru.....	2,970,000	405,040	Lima.....	Republic
Switzerland.....	2,906,752	15,981	Berne.....	Republic
Bolivia.....	2,325,000	481,600	La Paz.....	Republic
Bokhara.....	2,130,000	92,300	Samarcand.....	Abs. Desp
Venezuela.....	2,121,988	566,159	Caracas.....	Republic
Chili.....	2,115,340	307,525	Santiago.....	Republic
Denmark.....	2,045,179	14,842	Copenhagen.....	Lim. Mon
Bulgaria†.....	2,007,919	24,700	Sofia.....	Lim. Mon
Greece.....	1,979,453	24,977	Athens.....	Lim. Mon
Wurtemberg†.....	1,971,118	7,531	Stuttgart.....	Lim. Mon
Servia.....	1,820,000	18,777	Belgrade.....	Lim. Mon
Oman.....	1,600,000	81,000	Muscat.....	Abs. Mon
Guatemala.....	1,278,311	46,774	New Guatemala.....	Republic
Ecuador.....	1,146,000	248,370	Quito.....	Republic
Tripoli†.....	1,010,000	399,000	Tripoli.....	Abs Mon
Transvaal.....	800,000	110,193	Pretoria.....	Republic
Salvador.....	554,000	7,228	San Salvador.....	Republic
Uruguay.....	520,536	72,112	Montevideo.....	Republic
Paraguay.....	476,000	92,000	Asuncion.....	Republic
Honduras.....	458,000	42,658	Tegucigalpa.....	Republic
Nicaragua.....	400,000	51,660	Managua.....	Republic
Dominican Republic.....	300,000	20,596	San Domingo.....	Republic
Montenegro.....	245,380	3,486	Cetigno.....	Abs. Mon
Costa Rica.....	180,000	19,935	San José.....	Republic
Orange Free State.....	133,518	41,484	Bloemfontein.....	Republic
Hayti.....	93,200	29,830	Port-au-Prince.....	Republic
Hawaii.....	66,097	6,587	Honolulu.....	Lim. Mon

\* Estimated population, 1888. † Also enumerated with the Turkish Empire. ‡ Included in German Empire.

## EUROPE.

According to the latest census of its various states, the population of Europe amounts to 340,000,000, or one-fourth of the entire population of the world.

Religion—Christians, 328,000,000 (Roman Catholics, 160,000,000; Protestants, 85,000,000; Greek Church, 83,000,000). Mohammedans, 6,000,000; Jews, 5,700,000; Heathen, 300,000.

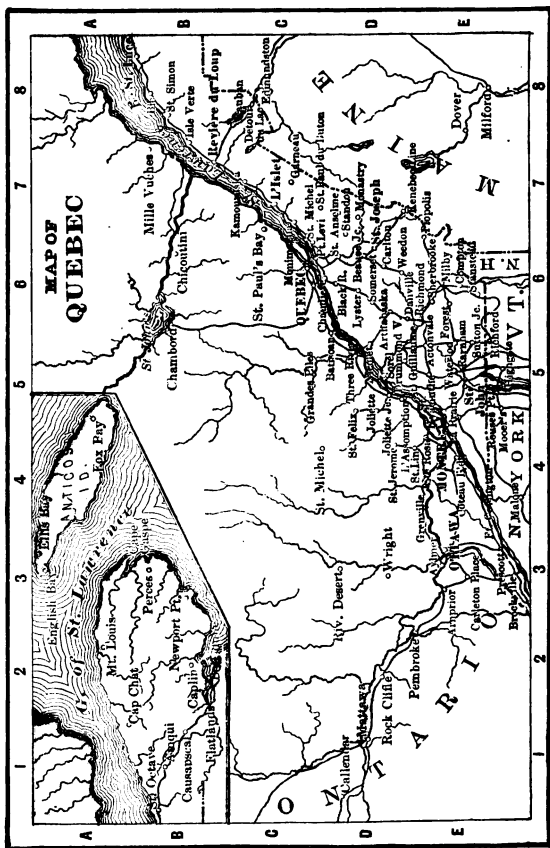
Climate—Mean annual temperature and rainfall: Mediterranean countries, 59°-66° F., 23-43 inches; Atlantic coasts, 37°-59° F., 19-118 inches; Baltic district, 37°-50° F., 15-23 inches; Black Sea district, 41°-53° F., 7-19 inches; Subarctic Europe, 19°-32° F.

**THE BRITISH ISLES.**—The British Isles comprise about 506 islands, of which one-half are inhabited. Religion—Church of England (Episcopal), about 14,000,000; Church of Scotland (Presbyterian), about 1,400,000; Roman Catholics, about 6,000,000; Dissenters, 6,000,000; Jews, 60,000. Government—Hereditary limited Monarchy. Executive, the Sovereign. Legislative, the Sovereign, the House of Lords, composed of 4 Royal Princes, 2 Archbishops, 22 Dukes, 19 Marquises, 114 Earls, 28 Viscounts, 24 Bishops, 286 Barons, 16 Scottish Representative Peers, and 28 Irish Representative Peers; 1 of the former and 2 of the latter are Peers of England. Total, 540. And lastly, the House of Commons, composed of 670 members, elected every Parliament—465 for England, 30 for Wales, 72 for Scotland, and 103 for Ireland.

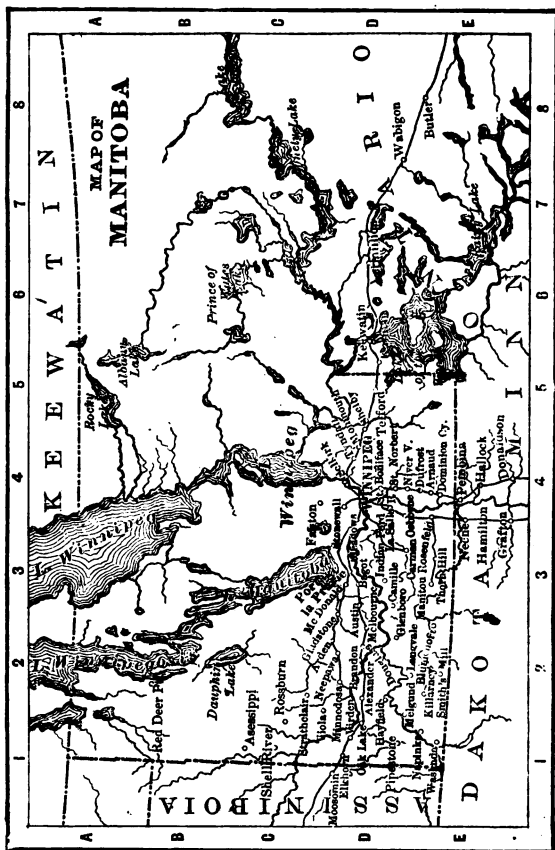
**ENGLAND AND WALES** form the southern and larger part of Great Britain. State Religion, Protestant Episcopal, 13,500,000; Dissenters, 12,500,000 (Methodists have 13,270 chapels; Independents, 2,603; Baptists, 2,243). Roman Catholics, 1,058,000; Jews, 60,000. There are 5 universities (Oxford, 3,090 students; Cambridge, 2,894; Victoria, 1,310; Durham, 181; and London); 13 university colleges with 6,800 students; 9 "great public schools" with 3,940 pupils; a large number of private and higher class schools; and 19,022 elementary schools attended by 4,505,825 pupils.

In England 80 per cent. of the whole area is productive; in Wales, 60 per cent. Cereal crops occupy a fourth of the productive area of England, and a sixth in Wales. But manufactures, mining, and trade entirely outstrip agricultural industry. Minerals—Coal, 1886, 137,039,441 tons annually, iron, lead, tin, copper, zinc, slate, salt, and shale. Factories—Cotton, 2,481 (465,654 employes); woollen, 1,503 (108,634); silk, 681 (40,134). Total number of textile factories, 6,359. Employes, 814,474.

**SCOTLAND** forms the northern and smaller part of Great Britain. Religion—Established Church of Scotland, 579,043



**QUEBEC** was originally settled by the French, and its present population is largely composed of descendants of the voyagers. The capital, Quebec, is the oldest city in the Dominion. Its fortifications, when taken by Gen. Wolfe, were considered, next to Gibraltar, the strongest in the world. The metropolis, Montreal, is noted for its churches.



**MANITOBA**, a province of Canada, is a great wheat-growing country, this cereal ripening in 110 days. Furs are also a leading product. The first settlers (1731) were French, and English traders first made their appearance in 1767. Climate very severe in winter, but occasionally hot in summer. Winnipeg is the capital.



## THE WORLD AND THE UNIVERSE.

members ; Free Church of Scotland, 333,098 members ; United Presbyterian, 182,170 members ; Episcopal, 76,939 ; Roman Catholic, 320,000. Education—There are 4 universities (Aberdeen, 830 students ; Edinburgh, 3,164 ; Glasgow, 2,231 ; St. Andrews, 212) ; 1 college (Dundee, 332 students) ; nearly 300 higher class schools with about 70,000 pupils ; and 3,092 elementary schools with (1886) 615,498 scholars. Government grant (1887), £445,883.

The total area of Scotland is 19,084,659 acres. and out of this number 14,613,446 acres consist of woods, bog and waste land, water, and hill-land. Only 25 per cent. of the whole area is productive. Cereal crops occupy a fourth of the productive area, and agriculture is limited to the plains and valleys of the east and south. Minerals—Coal (20,373,478 tons in 1886), iron, lead, slate, etc. Factories—Cotton, 147 (37,167 employes) ; woolen, 274 (27,546) ; flax, 152 (39,086) ; jute, 105 (36,269). Total number of textile factories, 776 with 152,279 employes.

**IRELAND** has the Atlantic Ocean on all sides except the east, where it is separated from Great Britain by St. George's Channel, the Irish Sea, and North Channel. Religion—Roman Catholics, 3,960,891 ; Protestant Episcopalians, 620,000 ; Presbyterians, 470,734 ; Methodists, 48,839 ; Jews, 472. Education—There are 2 universities (Dublin, 1,258 students, and the Royal University) ; 3 Queen's Colleges, Belfast (400), Cork (249), Galway (94) ; 1,500 superior schools with 200,000 pupils ; 8,024 elementary schools (1886) with an average attendance of 490,484. Government grant (1887) £888,966.

Ireland is essentially an agricultural country ; the mineral resources are small, and mining is not prosecuted with vigor. Of the whole area, 74 per cent. is productive, and cereal crops occupy one-ninth of this. Minerals—Coal is extensively distributed ; but from its inferior quality and its not being found near iron, it is not much wrought—only 105,563 tons having been produced in 1886. Iron ore is common, but smelting cannot be carried on for want of fuel. Manufactures—The chief manufacture is linen, which is mostly confined to Ulster. Factories—Linen, 166 (61,749 employes) ; woolen, 141 (3,136) ; cotton, 7 (1,248). Total number of textile factories, 330 with 68,158 employes.

**SPAIN** is bounded on the north by France and the Bay of Biscay ; on the west by the Atlantic Ocean and Portugal ; and on the south and east by the Mediterranean Sea. Religion—Roman Catholic, except 34,000 (6,654 Protestants). Government—Constitutional monarchy. Executive, the King. Legislative, the King, and Cortes, composed of the Senate with 360 members, and Congress of 431 members. Education—30,000 elementary

## THE WORLD AND THE UNIVERSE.

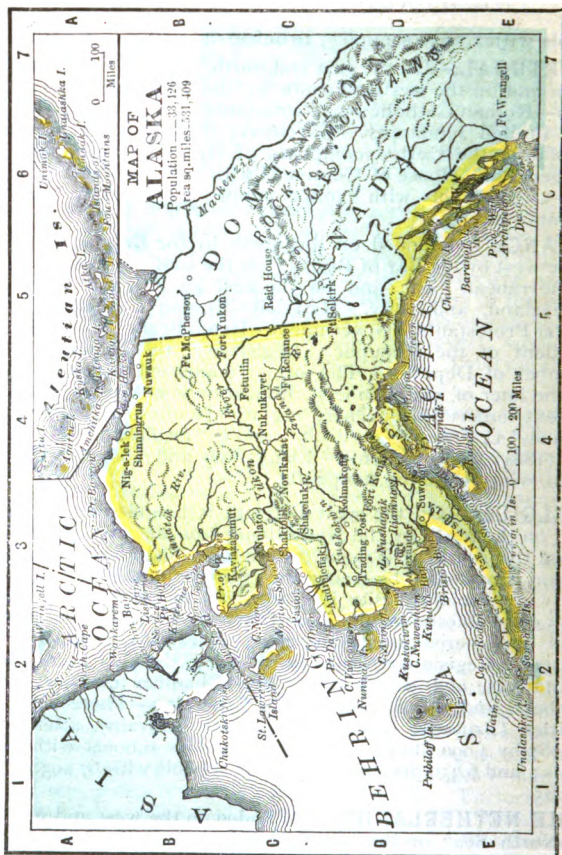
schools with 1,700,000 pupils ; 10 universities with 15,700 students.

**PORTUGAL.**—On the east and north Portugal is bounded by Spain, and on the west and south by the Atlantic Ocean. Religion—Roman Catholic; 500 Protestants. Government—Hereditary limited monarchy. Executive, the King and Cabinet. Legislative, the Cortes, composed of House of Peers with 162 members, and House of Commons with 149 members. Education—5,500 schools with 240,000 pupils ; 1 university with 670 students.

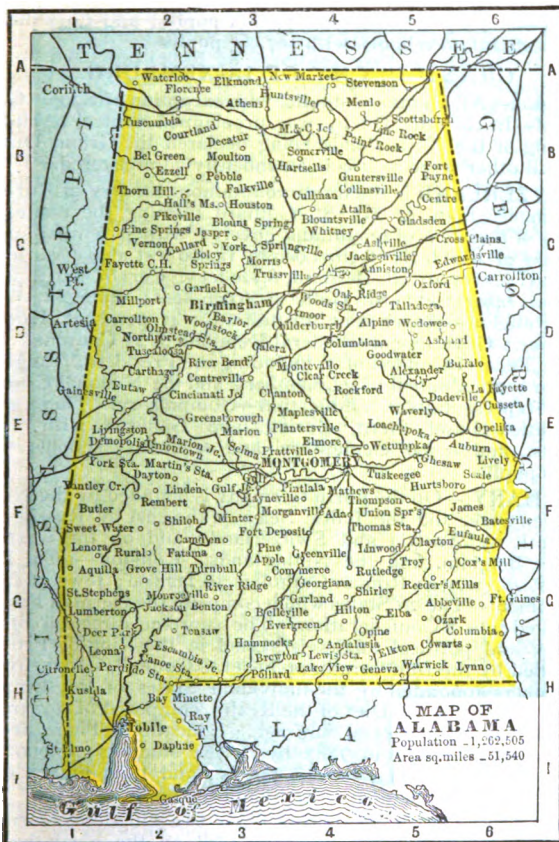
**FRANCE** is bounded on the north by the English Channel ; on the west by the Bay of Biscay ; on the south by Spain and the Mediterranean Sea ; and on the east by Belgium, Germany, Switzerland, and Italy. Religion—Roman Catholic. About 693,000 Protestants. Government—Republican. Executive, the President of the Republic. Legislative, the Senate and the Chamber of Deputies. The former composed of 300 members, and the later of 584 members. Education is entirely under Government supervision. There are 16 "facultés des lettres et des sciences," 14 "facultés de droit," and 6 "facultés de médecine," with (1884) 12,195 students. Elementary and secondary schools, 86,000, with over 6,000,000 pupils.

**BELGIUM.**—On the west Belgium is bounded by the North Sea ; on the north by the Netherlands ; on the east by Holland ; and on the south by France. Religion—The Roman Catholic religion is professed by nearly the entire population, though full liberty and social equality is granted to all confessions. There are 15,000 Protestants, and 3,000 Jews. Government—Constitutional and hereditary monarchy. Executive, the King and ministry. Legislative, vested in the King, the Chamber of Representatives, and the Senate. The Chamber consists of 138 members, and the Senate of 69. Education—There are 4 universities (Brussels, Ghent, Liège, and Louvain), attended in 1886-87 by 4,090 students ; 150 higher class schools with 27,675 pupils ; and 6,350 primary and infant schools with 673,938 pupils in 1885.

**THE NETHERLANDS** are bounded on the west and north by the North Sea ; on the south by Belgium ; and on the east by Germany. Religion—Protestants, 2,469,814 ; Roman Catholic, 1,439,137 ; Jews, 81,693. Government—Hereditary and constitutional monarchy. Executive, the King. Legislative, the King and Parliament or States-General, composed of the First Chamber with 50 members, and the Second Chamber with 100. Education—There are 4 universities (Leyden, Groningen, Utrecht, and Amsterdam), attended by (1886) 2,110 students ; 1,278 private and higher class schools, with (1885) 174,604 scholars ; 2,923



**ALASKA** was purchased from Russia in 1867 for \$7,500,000, and the United States Government has already regained that sum from the seal fisheries. Principal industries, fishing, canning, trapping and mining. The population is largely Indian, only about 2,000 being whites. The climate of Alaska is modified by the Pacific Gulf Stream and long summer days. Winter temperature at Sitka averages about the same as Washington, D. C.



**ALABAMA** ranks fourth in cotton, fifth in mules and molasses, sixth in sugar, seventh in rice and iron ore, tenth in bituminous coal, seventeenth in population. First settlement by the French at Mobile, 1711. Admitted to the Union 1819.

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public elementary schools, with 440,851 pupils; and 1,017 public and private infant schools, with 107,563 pupils

### GRAND DUCHY OF LUXEMBURG.

**Religion**—All Roman Catholic, with exception of 2,200. **Government**—In 1867 the Duchy was proclaimed neutral territory, the King of the Netherlands being declared the Grand Duke; but in all other respects it is independently administered.

**SWITZERLAND** is the most mountainous country in Europe, the immense mass of Mt. St. Gothard forming the center or nucleus of a system of mountains, covered with perennial snow, the peaks of which rise from 5,000 to 15,000 feet above sea level. The chief passes are St. Bernard, 8,120 feet; Cervin, 10,938 feet; Simplon, 6,595 feet; St. Gothard, 6,936 feet; Splügen, 6,945 feet. **Religion**—58 per cent. Protestants; 41 per cent. Roman Catholics. **Government**—Federal Republic of 22 Cantons. Executive, Federal Council of 7, including the President. Legislative, the State Council of 44 members, and the National Council of 145 Representatives. **Education**—Compulsory. There are 4 universities (Basel, Bern, Zurich, and Geneva), with 1,500 students, and 5,500 elementary and secondary schools with 500,000 pupils.

**GERMANY.**—On the north Germany is bounded by the North Sea, Denmark, and the Baltic Sea; on the east by Russia; on the south by Austria and Switzerland; and on the west by France, Belgium, and the Netherlands. **Religion**—1880. Protestants, 28,330,970; Roman Catholics, 16,232,600; Jews, 561,610. **Government**—The 26 States which comprise the German Empire are united into a Confederation. The supreme direction of the military and political affairs is vested in the King of Prussia, controlled by the Bundesrath, or Federal Council, consisting of 62 members appointed by the individual States of the Empire, and the Reichstag, or Diet of the Realm, composed of 397 members elected by universal suffrage. **Education**—There are 21 universities, attended in 1887 by 27,784 students; 57,000 elementary schools with 7,100,000 pupils; and 1,484 higher class and technical schools with 266,228 pupils.

**NORWAY AND SWEDEN.**—These two kingdoms, forming the Scandinavian Peninsula, are bounded on the north by the Arctic Ocean; on the east by Russia, the Gulf of Bothnia, and the Baltic Sea; on the south by the Baltic Sea, the Sound, Cattegat, and Skager Rack; and on the west by the Atlantic Ocean

### NORWAY.

**Religion**—Lutheran Protestant with the exception of 7,238. **Government**—Norway and Sweden together form an hereditary

## THE WORLD AND THE UNIVERSE.

and limited monarchy, the King of Sweden being also King of Norway, but each country having a separate legislative government. Executive, the King. Legislative, the Storthing, consisting of the Lagthing of 28 members, and the Odelsting of 86 members. Education—There are 6,600 elementary schools with 279,000 pupils ; and 1 university with 1,350 students.

### SWEDEN.

Religion—Lutheran Protestant, with 21,000 exceptions. Government—Executive, the King. Legislative, the Diet, composed of two Chambers, the First with 142 members, and the Second with 214 members. Education—There are 2 universities with 2,500 students, and 10,000 elementary and other schools with 700,000 pupils.

**AUSTRO-HUNGARY.**—Austria is bounded on the north by Poland, Silesia, and Saxony ; on the west by Bavaria and Switzerland ; on the south by Venetia, the Adriatic and the Balkan States ; and on the east by Moldavia and West Russia. Religion—Roman Catholics, 25,598,000 ; Protestants, 3,630,000 ; Jews, 1,646,000. Government—Austria and Hungary form a hereditary dual-monarchy, each country having its own Parliament, Ministry, and Administration. They are both united under a hereditary sovereign, the Emperor of Austria being also King of Hungary, and a controlling body known as the "Delegations." Education—Austria has 8 universities, attended in 1887 by 14,540 students ; 1,824 higher class schools with 180,162 pupils ; and 17,419 elementary schools with 2,781,220 pupils. Hungary has 2 universities, attended in 1887 by 4,169 students ; 374 higher class schools with (1885) 49,409 pupils ; and 16,717 elementary schools with 1,841,668 pupils.

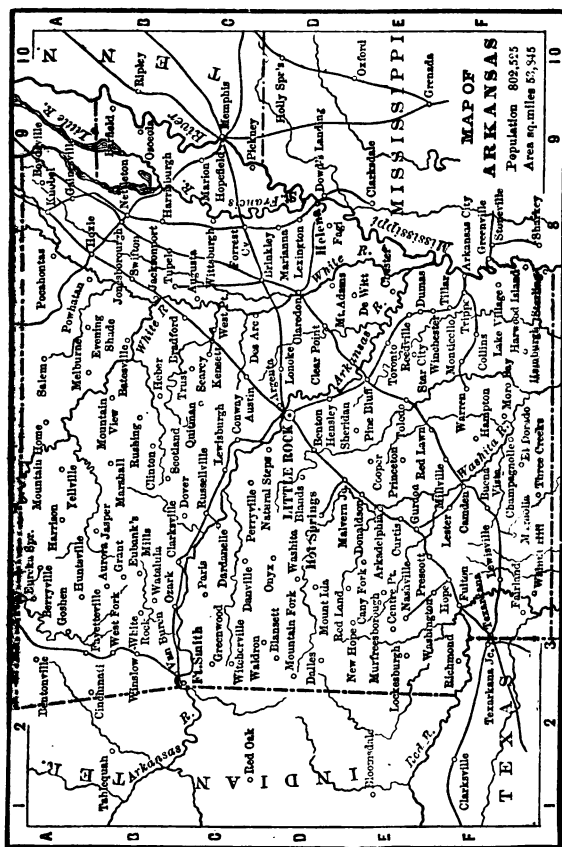
**ITALY.**—The Peninsula of Italy projects into the Mediterranean Sea, which forms its southern boundary. On the north it is bounded by Austria and Switzerland ; on the west by France and the Tyrrhenian Sea ; and on the east by the Adriatic Sea. Religion—Roman Catholic, but about 62,000 Protestants and 38,000 Jews. Government—Executive, the King. Legislative, the King and Parliament, consisting of two Chambers—the Senate, consisting of the Royal Princes and any number of distinguished men above 40 years of age who are nominated by the King. The Second Chamber, that of the Deputies, consists of 508 members elected by the people. Education—Italy had (1884) 21 universities with 13,334 students.

**DENMARK.**—On the west Denmark is bounded by the North Sea ; on the northwest by the Skager Rack ; on the east by the Cattegat, the Sound, and the Baltic ; and on the south by the Baltic and the German province of Schleswig. Religion—The



**ARIZONA** ranks fifth in silver, ninth in gold, eighth in sheep, forty-first in miles of railway, forty-third in population. First explored by the Spaniards in 1526; organized as a territory, 1863.





**ARKANSAS** ranks fifth among the States in cotton, ninth in mules, twenty-fifth in population. First settlement by the French at Arkansas Post, 1685. Admitted to the Union in 1836.



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State religion is Lutheran, though complete toleration is extended to every sect. In 1880 only 17,526 persons did not belong to the Lutheran Church. Of this number 3,946 were Jews and 2,985 Roman Catholics. Government—Hereditary Limited Monarchy. Executive, the King and Ministry. Legislative, the Rigsdag, or Diet, composed of the Landsting, or Upper House, with 66 members, and the Folkething, or House of Commons, with 102 members. Education—Elementary education is compulsory. The university at Copenhagen has about 1,300 students. There are 45 colleges and higher schools, and 2,940 parochial schools with 231,935 pupils.

**EUROPEAN RUSSIA** is bounded on the east by Siberia and the Caspian Sea ; on the south by Persia, the Black Sea, and Turkey ; on the west by Austria, Germany, the Baltic Sea, and Sweden ; and on the north by the Arctic Ocean. Religion—The established religion is the Russo-Greek. Protestants, 4,766,000 ; Roman Catholics, 8,910,000. Government—Absolute hereditary monarchy. Executive and legislative, the Czar. Administrative entrusted to four Councils, the Council of the Empire, the Ruling Senate, the Holy Synod, and the Committee of Ministers. Finland has a partly independent government—Grand Duke, the Czar. Education—Including Finland, there are—9 universities with 14,000 students, and 38,000 schools with 2,250,000 pupils. In 1882 only 19 per cent. of the Russian recruits could read and write.

**TURKEY IN EUROPE.**—The Ottoman Empire in Europe now, strictly speaking, only comprises the immediate provinces, the remainder of its territory being divided among the independent and tributary states of the Balkan Peninsula. Religion—More than one-half of the population are Christians, chiefly belonging to the Greek Church ; the remainder consist of Moham-medans, with a few Jews. Government—Absolute monarchy. The Sultan is ruler, and his will is absolute, in so far as it is not in opposition to the precepts of the Koran. The legislative and executive authority is exercised, under the supreme direction of the Sultan, by the Grand Vizier, the head of the temporal government, and the "Sheik-ul-Islam," the head of the church.

**GREECE** is bounded on the north by Turkey in Europe ; on the east by the Ægean Sea ; on the south by the Mediterranean Sea ; and on the west by Turkey and the Ionian Sea. Religion—Greek Orthodox Church with the exception of 46,000. Government—Limited monarchy. Executive, the King. Legislative, the Boulé (Chamber of Deputies) consisting of 150 representatives. Education—There are 2,600 schools attended by 140,000 pupils, and 1 university with 2,400 students.

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**MALTA.**—The Maltese group comprises the islands of Malta, Gozo, and Comino. Area—119 square miles (Malta, 95 square miles). Population—159,231 (excluding British soldiers). The Government is administered by a Governor, who is assisted by an Executive Council of 6 members, and by a Council of Government, 9 official and 8 elected members, of which the Governor is president. The British garrison consists of 5,216 British soldiers.

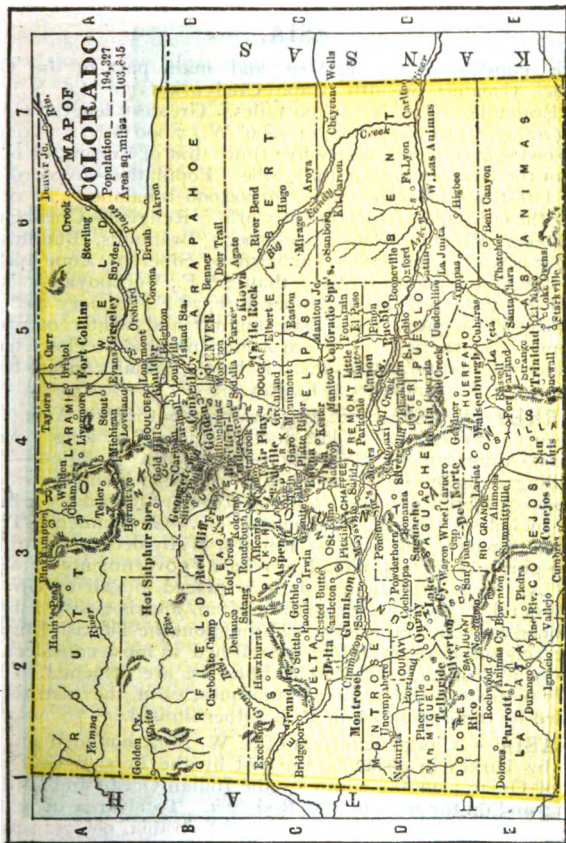
**GIBRALTAR.**—This celebrated fortress, commanding the entrance to the Mediterranean, belongs to Great Britain, and is situated on a rocky promontory in the south of Spain. Area—2 square miles. Population—1886 (including military), 24,139. The Governor in command of the garrison exercises all the executive and legislative authority. The garrison consists of 5,758 British soldiers.

**HELIGOLAND.**—Two islands in the North Sea, 25 miles from the mouth of the Elbe. Area—Three-quarters square mile. Population—1881, 2,000. Religion—Lutheran. Government—British dependency, with a Governor assisted by an Executive Council.

**CYPRUS.**—An island situated in the most eastern basin of the Mediterranean Sea. Area—3,584 square miles. Population—186,173. Religion—One-fourth Mohammedan, the remainder mainly of Greek Church. The Government of Cyprus is administered by Great Britain on behalf of the Ottoman Empire, the Legislature consisting of a High Commissioner, who is also Commander-in-Chief, with a Council of 18 members. Six members are non-elective, and three are chosen by the Mohammedan residents. Annual subsidy payable to Turkey, £92,800. There are a number of schools on the island; the Government grant in 1886-87, inclusive of that for building purposes, was £3,000.

**ICELAND.**—This island, belonging to Denmark, lies in the Atlantic Ocean, about 600 miles west of Norway and about 250 miles east of Greenland. Area—39,566 square miles. Population—72,445. Religion—All Protestants, belonging to the Lutheran Church. Government—The Legislative power is vested in the Althing, consisting of 36 members, 30 elected by popular suffrage, and 6 nominated by the King of Denmark. A Minister for Iceland, nominated by the King and responsible to the Althing, is at the head of the administration; while the highest local authority is vested in the Governor, called *Stiftamtmand*, who resides at Reykjavik. Education—The natives are distinguished for their love of learning, and, notwithstanding their poverty and adverse circumstances, it is rare to find an Icelander who cannot read and write. There is a college at Reykjavik,





**COLORADO** ranks first in silver, fourth in gold, thirty-fifth in population. First settlement, by Americans, near Denver, about 1850. Organized as a territory 1861; admitted to the Union, 1876.

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attended by about 100 scholars. The commerce consists in the exchange of wool, butter, skins, fish, and oil for European manufactures.

### ASIA.

Asia constitutes the eastern and main part of the Old World. Greatest breadth (Cape Chelyuskin  $78^{\circ} 12'$  N.) to Cape Romania ( $1^{\circ} 10'$  N.) 5,300 miles. Greatest length, Cape Baba ( $26^{\circ} 3'$  E.) to East Cape ( $160^{\circ} 0'$  W.) 7,000 miles. Area—17,300,000 square miles, nearly five times that of Europe, or one-third of the land surface of the globe. Population—According to the latest estimates there are 840,000,000 inhabitants, or one-half of the entire population of the world. Religion—Christians, 15,000,000; Mohammedans, 80,000,000; Brahmins, Buddhists, etc., 745,000,000. Climate—Northern or Siberian Zone has a mean annual temperature of less than  $32^{\circ}$  F., Verkhoyansk (the pole of greatest cold), mean temperature,  $2^{\circ}$  F., January  $56^{\circ}$  F., July  $59.8^{\circ}$  F. Central Zone has summer and winter of great extremes. Southern and Eastern Zones (monsoon region) have a regular alternation of seasons. Lahore (Panjab), mean temperature,  $75^{\circ}$  F., January  $53^{\circ}$  F., June  $93^{\circ}$  F.

**TURKEY IN ASIA**, the western promontory of Asia, lies between  $12^{\circ} 30'$  and  $42^{\circ}$  N. lat., and  $26^{\circ}$  and  $48^{\circ}$  E. long. Area—680,000 square miles. Population—16,174,100. Religion—The prevailing religion is Mohammedanism, of which there are 12,000,000 adherents, while about 3,000,000 are nominally Christians, including Greeks, Armenians, etc. Government—This, the greater part of the Turkish Empire, is divided for administrative purposes into 24 official provincial governments or vilayets. At the head of each of these is placed a Vali or Governor-General, who represents the Sultan, and is assisted by a provincial council. Education—Throughout the Turkish Empire public schools have been long established in most considerable towns, while colleges, with public libraries, are attached to the greater number of the principal mosques. But the instruction afforded by these establishments is rather limited.

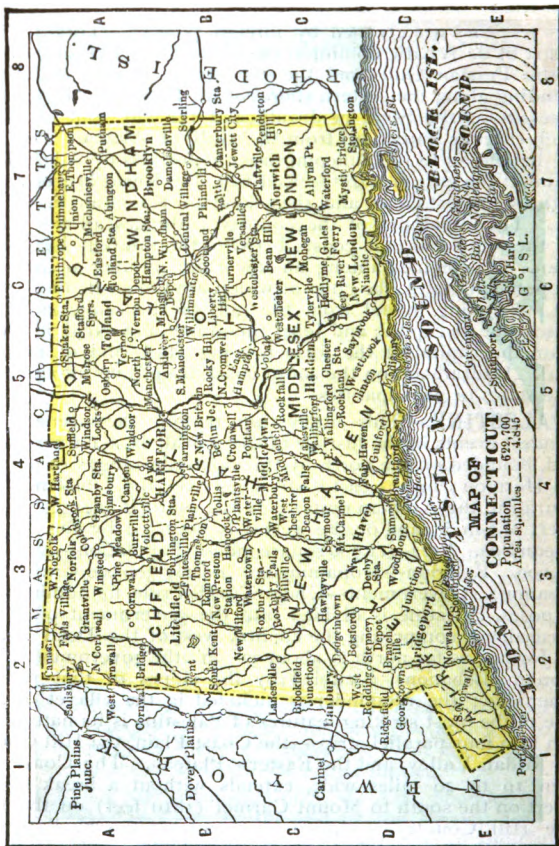
**ARABIA.**—A huge peninsula of S. W. Asia, bounded on the north by Turkey in Asia; on the east by the Persian Gulf and Gulf of Oman; on the south by the Indian Ocean and Gulf of Aden; and on the west by the Red Sea. Total area of peninsula, 1,219,000 square miles (independent Arabia, 966,952 square miles). Population—(Estimated) 3,700,000. The inhabitants are either Bedouins or "wanderers," or "Hadesi," settled in towns and villages. Religion—With the exception of a few Jews the inhabitants are Mohammedans. At no time has Arabia been united into one harmonious whole, and at present large portions

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of its territory are claimed by foreign powers. Turkey claims as part of its Asiatic dominion the district of El Hasa bordering on the Persian Gulf, and the vilayets of Hadjaz and Yemen extending along the eastern shores of the Red Sea. Egypt holds possession of the Sinai peninsula and the old land of Midian which extends southward from the Gulf of Akaba. The territory belonging to Britain comprises the fortress of Aden, Perim Island at the entrance to the Red Sea, the Kuria Muria Islands off the southeast coast, and the island of Kamaran in the Red Sea. The remainder of the country embraces all the interior and the south and east coasts between the Bahrein Islands and Aden. It is divided among an uncertain number of petty and independent states, the chief of which are Oman in the extreme east, extending inland from the gulf of the same name, with Muscat for its capital, and Jebel Shammar and Nejd in the interior, the capital of the former being Hail, and of the latter Riad. Hadramaut, on the south coast, is split up into numerous little states or principalities.

**PALESTINE.**—This interesting region, the scene of the grandest events in the history of the world, is a narrow belt of land, bounded on the north by the mountain ranges of Lebanon and Hermon; on the east it stretches over the tableland of the Hauran to the Arabian desert; on the south it merges into the desert of Sinai; and on the west it is bounded by the Mediterranean Sea. Area—11,000 square miles. Population—Estimated, 700,000. Religion—Mohammedan (nearly 300,000 Christians in Lebanon). Government—Under Turkish rule, for administrative purposes, Palestine is divided into the government of el Kuds (Jerusalem), comprising the country west of the Dead Sea and the Jordan, as far north as about  $32^{\circ} 30'$ ; the government of Jebel Libnan (Lebanon), occupied by the slopes of that range on either side; the remainder is included in the vilayet of Syria. One of the most striking features of Palestine is its natural division into four parallel strips—the Coast Plain, the Hill Country, the Jordan Valley, and the Eastern Plateau. The Coast Plain, from 10 to 20 miles wide, extends without a break from the desert on the south to Mount Carmel (1810 feet) on the north. The Hill Country, commencing south of the Mediterranean, traverses the country from south to north (Mount Hermon, 9,400 feet; Mount of Olives, 2,683 feet). The Jordan Valley runs nearly parallel to the coast from the base of Mount Hermon to the Dead Sea, which occupies its deepest portion. The Eastern Plateau has a height of 2,500 to 3,000 feet, attaining its greatest altitude in Mount Hor (Jebel Horoun), 4,580 feet.

The one great river of Palestine is the Jordan, which, emerging from underground as a full-bodied stream at the Springs of Has-



**CONNECTICUT** ranks first among the States in clocks, third in silk goods, fourth in cotton goods, eighth in tobacco, twenty-third in population. First settlement, by English, at Windsor, 1635. One of the thirteen original States.





**DAKOTA** in 1880 ranked third in gold, ninth in silver, twenty-sixth in miles of railway, thirty-ninth in population. First settlement, by Americans, at Pembina. Organized as a territory 1861; Admitted into the Union as two States, 1889. Population, 1887, estimated 568,477 (special census, 1885, 415,610).



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beiya, 847 feet above the sea, flows first through the Waters of Meron, then through the Sea of Galilee, 682 feet below the Mediterranean, from which it passes down the wide valley of El Ghor, and finally falls into the Dead Sea, the surface of which is 1,292 feet below the Mediterranean.

**PERSIA** is bounded on the north by the Caspian Sea and Asiatic Russia; on the west by Turkey in Asia; on the south by the Persian Gulf and Arabian Sea; and on the east by Afghanistan and Baluchistan. Religion—Mohammedan with about 74,000 exceptions. Government—Despotic, the power of the Shah (Nasir-ed-Din, s. 1848), being absolute, in so far as it is not opposed to the accepted doctrines of the Koran. Under him, the Executive is carried on by a Council of 19 Ministers, presided over by a brother of the Shah. Education—There are a large number of colleges supported by public funds, and numerous schools for children. A larger proportion of the population of Persia are possessed of the rudiments of education than of any other country in Asia, except China.

**AFGHANISTAN.**—A country on the N. W. frontier of India, bounded on the north by Turkestan; on the east by India; on the south by Baluchistan; and on the west by Persia. Area—298,235 square miles (inclusive of Kafiristan). Population—4,500,000, mainly Mohammedans of the Sunni sect. Government—Emir. In consequence of its inaccessible highland tracts, its numerous races and their tribal organization, no civil administration can be said to exist beyond the collection of the revenue.

**BALUCHISTAN** is bounded on the north by Afghanistan; on the east by India; on the south by the Arabian Sea; and on the west by Persia. Area—106,635 square miles. Population—500,000; Mohammedans of Shiah and Sunni sects. Government—The Khan concluded a treaty in 1876 with Britain, by which he has become a feudatory of the Empress of India. This treaty places the whole country at the disposal of the British Government for all military and strategic purposes.

**KHIVA AND BOKHARA.**—Two Khanates, bounded on the north by the Sea of Aral and Russian possessions; on the south by Afghanistan and Russian possessions; and on the west by the Trans-Caspian district; being separated from each other by the Oxus. Area—Khiva, 22,290 square miles; Bokhara 92,168 square miles. Population—Khiva, 700,000; Bokhara, 2,130,000. Religion—The inhabitants of both states are Mohammedans. Government—Bokhara, since the capture of Samarkand by Russia, 1868, is little more than a vassal state of that country, though still allowed to enjoy a certain show of political independence under a Khan or Mir. Khiva—The Russians cap-

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tured Khiva in 1873, abolished slavery, and compelled the Khan to acknowledge himself a vassal of the Czar.

**INDIA.**—On the north India is bounded by the Himalaya Mountains; on the west by Afghanistan, Baluchistan, and the Indian Ocean; on the south by the Indian Ocean; and on the east by the Bay of Bengal and Indo-China. Population—British Territory, exclusive of Upper Burma, 198,790,853; Native States, 55,150,456; Ceylon, 2,763,984; Nepal and Bhotan, 2,700,000; French Possessions, 273,611; Portuguese Possessions, 475,172; total, 260,154,076. Religion—187,000,000 Hindus; 50,000,000 Mohammedans; 3,500,000 Buddhists; 1,862,634 Christians (Roman Catholics, 963,059; Protestants, 535,081; other sects, 364,494). Government—Executive, the British Viceroy. Administrative, the Secretary of State for India, and Council of 15 members. Education, 1885—4 universities (Calcutta, Madras, Bombay, and the Panjab). The total number of educational institutions (1885-86), 122,516, with 3,332,851 students.

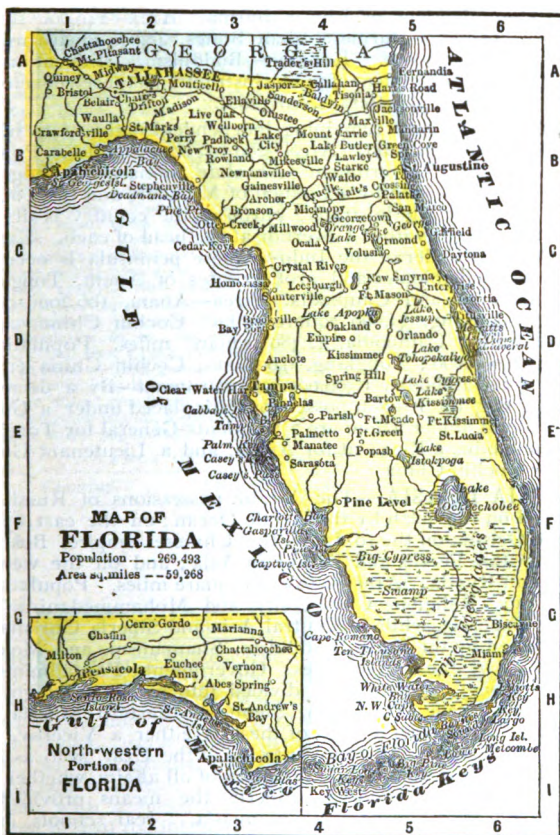
**CHINA.**—The Chinese Empire is bounded on the north and northwest by Asiatic Russia; on the south and southwest by British India; on the southeast by Indo-China; and on the east by the Pacific Ocean. Estimated area of the Empire, 4,469,200 square miles (China proper, 1,554,000 square miles; Manchuria, 380,000 square miles; Mongolia and Zungaria, 1,452,000 square miles; Thibet, 651,500 square miles; Eastern Turkestan, 431,700. Population—China proper, 382,078,860; Manchuria, 12,000,000; Mongolia and Zungaria, 2,600,000; Thibet, 6,000,000; Eastern Turkestan, 580,000. Religion—Bulk of the people, Buddhists; religion of the state and higher classes, Confucianism; 30,000,000 Mohammedans; 1,000,000 Roman Catholics; 50,000 Protestants. Government—Despotic monarchy. Administrative, the "Nei-ko" or Cabinet (4 members and two assistants). Education—In China proper few are unable to read and write. Communication—20,000 miles of imperial roads, 40 miles of railway built but unused, and 5,482 miles of telegraph wire.

**JAPAN.**—Religion—Chiefly Buddhism (74,400 priests); Shin-tôism (15,058 priests); Christians, 1883, 40,524; Christianity gaining rapidly. Government—Absolute monarchy—Emperor or "Mikado." Education, 1884—1 university with 1,880 students; 29,233 elementary schools with 3,233,226 scholars; and 1,636 high and other schools with 89,879 pupils. Railways—370 miles in 1887.

**BURMA.**—Upper Burma until recently was an independent kingdom, governed by King Theebaw, a despotic monarch, but, early in 1886, the King was deposed and pensioned, and the country annexed to the Indian Empire, being placed under the



**DELAWARE** ranks twenty-first among the States in orchard products, thirty-seventh in population. First settlement, by Swedes, at Cape Henlopen, in 1627. Delaware is one of the thirteen original States.



**FLORIDA** ranks third among the States in sugar and molasses, sixth in rice, tenth in cotton, thirty-fourth in population. First settlement, by Spaniards, at St. Augustine, 1565. Admitted into the Union in 1845.

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Chief Commissioner of Lower Burma. Area—140,000 square miles (exclusive of Burmese Shan States, 40,000 square miles). Population—3,500,000. Religion—Buddhism. Education—A complete national system of public instruction has been developed, and a knowledge of letters is universal.

**SIAM** is the only remaining independent native state in the Indo-Chinese peninsula. Area—280,303 square miles. Population—5,750,000. Government—Absolute monarchy. Legislative, the King assisted by a Council of Ministers and the Council of State. For administrative purposes the country is divided into 41 provinces with a Governor at the head of each. East of Siam the remainder of the Indo-Chinese peninsula is occupied by the French colonies and protectorates of Anam, Tongking, Cochin China, and Cambodia. Area—Anam, 106,290 square miles; Tongking, 35,000 square miles; Cochin China, 23,090 square miles; Cambodia, 32,380 square miles. Population—Anam, 6,000,000; Tongking, 9,000,000; Cochin China (1883), 1,639,777; Cambodia, 1,500,000. Government—By a decree of October 1887 the French possessions are placed under a Governor-General, under whom are 2 Residents-General for Tongking and Cambodia, a Resident for Anam, and a Lieutenant-Governor for Cochin China.

**RUSSIA IN ASIA.**—The Asiatic possessions of Russia are bounded on the north by the Arctic Ocean; on the east by the Pacific Ocean; on the south by the Chinese Empire, Bokhara, Afghanistan, Persia, and Turkey in Asia; and on the west by European Russia. Area—6,645,720 square miles. Population—15,865,740. Religion—Christianity and Mohammedanism prevail in Caucasia, while in Central Asia and Siberia Christianity is professed by the Slavs, Buddhism, Shamanism, and Mohammedanism by the native races. Government—For administrative purposes the country is divided into five general governments—Caucasus, Turkestan, Stepnoye, Eastern Siberia, and Amur. At the head of each of these is either a Viceroy, or a Governor-General, the representative of the Czar, who as such has the supreme control and direction of all affairs, whether civil or military. Education—In Siberia the means provided for higher education consist of 15 gymnasia, 2 real schools, and 3 normal schools. Primary education is in a very unsatisfactory state, there being only 665 schools, scattered over the whole country, with an attendance of 23,470 pupils.

## OCEANIA

Comprises all the islands and archipelagos in the Pacific Ocean and is usually divided into the four great sections of Malaysia,

## THE WORLD AND THE UNIVERSE.

**Micronesia, Melanesia or Australasia, and Polynesia.** Total area—4,211,093 square miles. Population—39,161,370.

**I. MALAYSIA** is usually considered as part of Asia under the "East Indian Archipelago," but here it is included with Oceania. Chief islands—Sumatra, 179,290 square miles; population, 1884, 2,948,715. Java, 50,800 square miles; population, 20,931,654. Borneo, 284,918 square miles; population, 1,858,000. Celebes, 77,179 square miles; population, 933,823. Moluccas, 20,429 square miles; population, 352,580. Philippines, 114,219 square miles; population, 5,636,232. Lesser Dutch Islands, 42,489 square miles; population, 2,000,000. The total area of its islands is 769,324 square miles, and the population 34,661,000.

**II. MICRONESIA** includes the Caroline and Pelew Islands, 1,450 square miles; population, 36,000. Mariannes, 443 square miles; population, 8,665. Gilbert Islands, 165 square miles; population, 35,200. Marshall Islands, 154 square miles; population, 11,600. Total area, 1,322 square miles; population, 91,465.

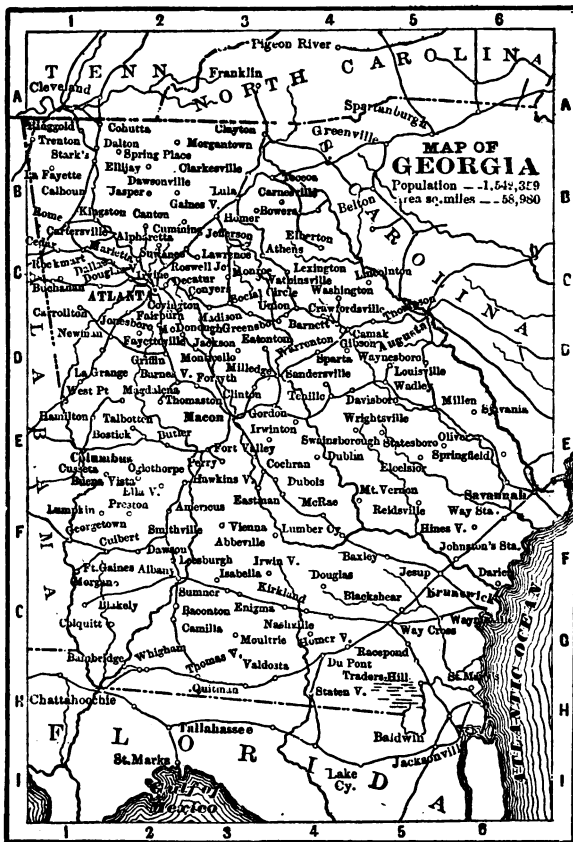
**III. MELANESIA OR AUSTRALASIA** comprises the great islands of Australia, 2,948,798 square miles; population, 1885, 2,631,553. Tasmania, 26,215 square miles; population, 137,211. New Zealand, 104,403 square miles; population, 578,482. Fiji Islands, 8,048 square miles; population, 126,000. New Guinea, 311,580 square miles; population, 2,500,000. New Caledonia and Loyalty Islands, 7,644 square miles; population, 60,703. Solomon Islands, etc., 23,546 square miles; population, 252,350. Total area, 3,430,234 square miles; population, 4,229,155.

**IV. POLYNESIA**—Chief groups, Friendly Islands, 384 square miles; population, 25,000. Samoa Islands, 1,073 square miles; population, 36,800. Society Islands, 636 square miles; population, 16,300. Marquesas, 491 square miles; population, 5,776. Sandwich Islands, 6,558 square miles; population, 57,985. Total area, 10,313 square miles; population, 179,550.

TABLE OF EUROPEAN POSSESSIONS.

COUNTRY.	AREA IN SQUARE MILES.	POPULATION.
British, - - -	3,169,389	3,223,041
Dutch, - - -	718,800	28,500,000
Spanish, - - -	116,250	5,680,665
German, - - -	88,650	343,600
French, - - -	9,104	85,753
Portuguese, - - -	6,290	300,000

**AUSTRALIA.**—Greatest length, Cape Byron (153° 38' E.) to Steep Point (113° E.), 2,400 miles. Greatest breadth, Cape York (10° 40' S.) to Cape Wilson (39° 10' S.) 2,000 miles. Area—2,948,798 square miles (Victoria, 87,884 square miles; New South Wales, 310,700 square miles; Queensland, 668,224 square miles; South Australia, 903,690 square miles; West Australia, 978,300 square miles). The surface is for the most part a level plateau, with a mean elevation of 1,180 feet above sea level. A large part of the interior, particularly in the west, consists of sandy and stony desert. The mountainous region is almost exclusively confined to the eastern and southeastern coasts, where, at an average distance of sixty miles, a belt of about 150 miles in width is formed. The only great river system is that of the Murray, 1,550 miles long, with a drainage area of 270,000 square miles. Inland salt lakes are a characteristic feature of the continent, the chief being Lakes Eyre, Torrens, Gairdner



**GEORGIA** ranks second among the States in rice and sweet potatoes, third in cotton and molasses, fourth in sugar, seventh in mules, tenth in hogs, thirteenth in population. First settlement, by English, at Savannah, 1733. One of the thirteen original States.



**IDAHO** ranks sixth among the States and Territories in gold, seventh in silver, forty-fifth in population. First settlement, by Americans, in 1842. Organized as a Territory in 1863. Population, 1887, territorial census, 143,669. "Idaho" means light on the mountains. Admitted to the Union 1890.



## THE WORLD AND THE UNIVERSE.

and Amadeus. North Australia and the north part of Queensland lie in the torrid zone and have a mean temperature of  $78^{\circ}$  F. In the temperate zone extreme temperatures prevail. Brisbane, maximum  $102^{\circ}$ ; minimum  $40^{\circ}$  F. Sydney, average  $61^{\circ}$  F. Melbourne, maximum  $105^{\circ}$ ; minimum  $30^{\circ}$  F. Adelaide, maximum  $110^{\circ}$ ; minimum  $35^{\circ}$  F. Perth, average  $65^{\circ}$  F.

**NEW SOUTH WALES**—Is the oldest of the Australasian colonies. Area—310,700 square miles. Population—Estimated 1,022,767, exclusive of 7,984 aborigines. Religion—Protestants, 516,512; Roman Catholics, 207,606; Jews, 3,266. Government—Executive, the Governor, appointed by the British Crown, assisted by a Cabinet of 10 Ministers. Legislative, the Parliament consisting of the Legislative Council of 52 members, and the Legislative Assembly of 122 members. Education—In 1886 there were 1 university (Sydney), attended by 340 students; 3 colleges and one grammar school with 480 scholars; 647 private schools with 38,766 pupils; and 2,250 schools under the Department of Public Instruction with 186,126 scholars.

**VICTORIA**.—Area—87,884 square miles. Population—Estimated 1,027,749, exclusive of 594 aborigines. Religion, 1881—Protestants, 613,183; Roman Catholics, 203,480; Jews, 4,330. Government—Executive, the Governor, appointed by the British Crown, assisted by an Executive Ministry of 10 members. Legislative, the Parliament, composed of the Legislative Council of 42 members, and the Legislative Assembly of 86 members. Education—Free, secular and compulsory. There were, 1885, 1 university at Melbourne with 2 affiliated colleges attended by 444 students, 1846 state-aided schools attended by, in 1886, 230,576 pupils, and 707 private schools with 44,059 scholars.

**QUEENSLAND**.—Area—668,224 square miles. Population—(Estimated), 354,596 (aborigines about 20,000). Religion—1886, Protestants, 217,991; Roman Catholics, 77,077; Jews, 724. Government—Executive, the Governor, appointed by the British Crown, assisted by an Executive Council of 7 ministers. Legislative, the Parliament consisting of the Legislative Council of 39 members, and the Legislative Assembly of 59 members. The defence forces comprise a volunteer corps of from 3,000 to 4,000 men, two gunboats and one torpedo boat. Education—Free and secular. In 1886 there were 7 grammar schools attended by 565 pupils; 108 private schools with 8,177 pupils; and 479 public elementary schools with 58,939 scholars.

**SOUTH AUSTRALIA**.—The name South Australia would appear to imply that this colony is confined to the south of the continent, but on the contrary it extends to the farthest north, under the name of the Northern Territory. Area—90309,6

## THE WORLD AND THE UNIVERSE.

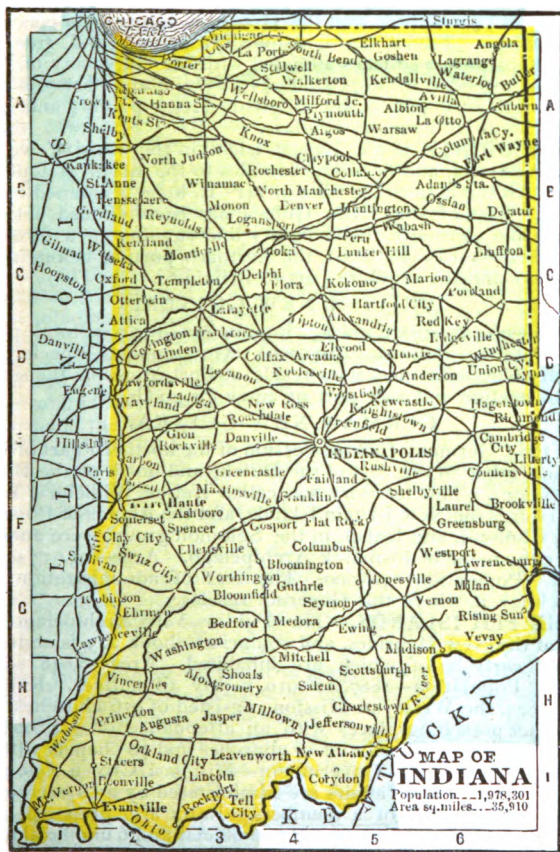
square miles. Population—Estimated 313,355 (exclusive of aborigines). Religion—Church of England, 75,812; Roman Catholics, 42,628; and Wesleyan Methodists, 42,103. Government—Executive, the Governor, appointed by the British Crown, and an Executive Council of 6 members. Legislative, the Parliament consisting of the Legislative Council with 24 members, and the House of Assembly with 52 members. Education—The system of education is liberal, compulsory, state-aided, and secular. There were, 1885, 1 university (Adelaide) with 150 students, 472 public schools, attended by 49,664 pupils, and 363 private schools with 13,524 scholars.

**WESTERN AUSTRALIA.**—This, the largest of the Australasian colonies, includes all that portion of Australia situated to the westward of 129° East long. Area—978,300 square miles. Population—1886, 39,584. Religion—Protestants, 20,613; Roman Catholics, 8,413. Government—Executive, the Governor, appointed by the British Crown, assisted by an Executive Council of 6 members. Legislative, the Legislative Council composed of 9 nominated and 17 elected members. Education—State-aided, secular, and compulsory. There are 2 grammar schools, 77 elementary schools, attended by 3,192 pupils, and 17 assisted schools with 1,287 scholars.

**TASMANIA.**—This island in the South Pacific Ocean is situated between the parallels of 40° 33' and 43° 40' S. lat., and 144° 40' and 148° 23' meridians E. long., at the southeastern extremity of the Australian mainland, from which it is separated by Bass Strait, about 150 miles wide. Area—26,215 square miles. Population—1887, 137,211 (aborigines quite extinct). Religion—Protestants, 102,551; Roman Catholics, 30,516; Jews, 316. Government—Executive, the Governor, appointed by the British Crown, assisted by an Executive Council of 4 members. Legislative, the Parliament, composed of the Legislative Council of 18 members, and the House of Assembly of 36 members. Education—Compulsory. There are 16 superior schools or colleges. Primary education is administered by a department under which are 209 public elementary schools, attended by 16,014 scholars.

**NEW ZEALAND.**—Situated about 1,200 miles to the southeast of Australia, consists of a group of three principal islands, called respectively, the North, South, and Stewart Islands, and several islets mostly uninhabited. Area—104,403 square miles. (North Island, 45,687 square miles; South Island, 57,313 square miles; Stewart Island, 1,300 square miles). Population—1886, 578,482 (exclusive of 41,969 Maoris). Religion—Protestants, 461,340; Roman Catholics, 79,020; Jews, 1,559. Government—Executive, the Governor, appointed by the British Crown, as-





**INDIANA** ranks second in wheat, fourth in corn, hogs and agricultural implements, sixth in coal and population, seventh in cattle and miles of railway. First settlement, by French, at Vincennes, 1730. Admitted to the Union, 1816.

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sisted by the Ministry of 7 members. Legislative, the Governor and the "General Assembly," composed of the Legislative Council of 54 members, and the House of Representatives with 95 members. Education—Compulsory, secular and free. In 1885, there were 3 colleges affiliated with the University of New Zealand, attended by 1,075 students; 23 grammar schools with 2,358 pupils; 288 private schools with 12,473 pupils; and 1,054 state schools with 105,234 scholars.

**NEW GUINEA** is the largest island in the world, if we exclude Australia, and lies some 80 miles to the north of Queensland. All the land to the west of 141° E. long. is claimed by the Dutch. East of this, New Guinea has been divided between Britain and Germany, the boundary line running in a direction from northwest to southeast, the northern portion belonging to Germany and the southern part to Britain.

### BRITISH NEW GUINEA.

Area—86,457 square miles. Population—135,000 (total population of New Guinea, 2,500,000). Government—Special and Deputy Commissioners who reside at Port Moresby, the seat of administration and only port of entry for goods, etc.

### GERMAN NEW GUINEA.

In 1885, Germany took possession of the northern part of New Guinea, lying to the east of the Dutch, and north of the British possessions. This territory was called Kaiser Wilhelm's Land. Afterwards the New Britain Islands, and the islands of Bougainville, Choiseul, and Isabel, in the Solomon group, were annexed under the name of Bismarck Archipelago. Area—95,653 square miles. Population—318,000. The seat of administration is at Finschhafen, where the Governor resides.

**THE FIJI ISLANDS.**—The Fiji or Viti Archipelago lies east of the New Hebrides, and comprises about 225 islands and islets, nearly 80 of which are inhabited. Area—8,048 square miles. Population—1887, 126,010, nearly all natives. Religion—In 1885, the Wesleyan Mission consisted of 976 churches, and 279 other preaching-places with an attendance of 104,866; the Roman Catholic Mission of 14 churches and 70 chapels with an attendance of 9,100. Government—Fiji is a Crown colony of Great Britain and its affairs are administered by a Governor and Executive Council of 4 members. Laws are prepared by a Legislative Council, consisting of 6 official and 6 unofficial members, of which the Governor is president. Native administration is carried on through the chiefs under the Governor's supervision. Education—Two public schools, state-supported, had an attendance, in 1885, of 267. 42,698 scholars are taught by the native teachers of the Wesleyan Mission. The Roman Catholic

## THE WORLD AND THE UNIVERSE.

Missionis conduct 84 native schools with 1,040 scholars. The chief exports are sugar, copra and cotton.

### AFRICA

Forms the vast southwestern peninsula of the Old World, being joined to Asia by the narrow isthmus of Suez. Greatest length, 5,000 miles. Greatest breadth, 4,600 miles. No other land division on the globe has such a rounded and compact outline. Access to the interior is rendered difficult by the general absence of gulfs and large inlets. The coast line measures 16,000 miles, or 720 square miles of surface to each mile of coast. Area—About 11,000,000 square miles, being three times that of Europe, or one-fifth of the land surface of the globe. Population—No definite figures exist for the larger part of Africa, but the population is estimated at about 200,000,000, or over one-seventh of the inhabitants of the world. Climate—Only the northern shores and the southern extremity of the continent have a mean temperature of less than 68° F. with winter rains. From 18° N. lat. to 20° S. lat. extends the region of tropical rains; maximum temperature in Khartoum, 115° F. The rainless regions are the Sahara and the Kalahari.

**SOUTH AFRICA.**—The southern extremity of Africa, washed by the Atlantic Ocean on the west and by the Indian Ocean on the south and east, comprises the colonies and protectorates of Great Britain, the Dutch republics, and various less important divisions.

#### CAPE COLONY

Is a British possession. Executive, the Governor and Executive Council. Legislative, the Legislative Council of 22 members and House of Assembly of 74 members.

#### NATAL.

The Government of Natal is administered for the British Crown by a Governor, assisted by an Executive Council and a Legislative Council of 30 members.

#### SOUTH AFRICAN REPUBLIC.

Government—Under the suzerainty of the British Crown. Executive vested in the President. Legislative in the Volksraad of 44 members.

#### ORANGE FREE STATE.

Government—Executive, the President assisted by an Executive Council. Legislative, the Volksraad of 56 members.

**CENTRAL AFRICA.**—With the rapid advance which exploration has made in Central Africa within recent years, there has followed a great rivalry among European nations for colonies and protectorates. Since the founding of the Congo Free State,









## THE WORLD AND THE UNIVERSE.

international commissions have distributed native territory so freely, that in a short time but few of the original states will remain.

### CONGO FREE STATE.

In 1885, the Congo Free State was constituted and defined by the International Conference held at Berlin. It was declared neutral and free to the trade of all nations, and has been successively recognized by all the leading countries of the world. The state is placed under the sovereignty of Leopold II., King of the Belgians, and is governed by an Administrator-General, who resides at Boma, the capital. Area, 800,000 square miles. Population, 24,000,000. Annual grant from Leopold II., \$200,000.

### EASTERN EQUATORIAL AFRICA.

A commission was appointed in 1886, by Britain and Germany, to fix the boundaries of Zanzibar with reference to German territory. They agreed that Zanzibar is to possess a strip of coast from Cape Delgado to the Tana River, and extending ten miles inland, with several ports north of the latter; that Germany is to have, as a sphere of influence, the country stretching from the Rovuma River, northward to and including Kilimanjaro; and that Britain's sphere embraces the country between Kilimanjaro and the Tana River.

Zanzibar—Area, 9,190 square miles (Zanzibar Island, 614 square miles; Pemba, 372 square miles; Mafia, 210 square miles; Mainland, 8,000 square miles). Population, 250,000. Imports, 1883, \$6,000,000; Exports, \$4,000,000.

Germany—Protectorates, Wito Land, 5,200 square miles; Usagara, etc., 20,700 square miles; territory in which protectorates may be established, 122,800 square miles.

British territory in which protectorates may be established, 72,000 square miles.

### THE PORTUGUESE COLONIES

South of the Equator are named, respectively, Angola and Mozambique. The former, on the west coast, extends from the Cunene River to the mouth of the Congo and includes the small territories of Cabinda and Landana, north of the latter. Area, 115,000 square miles; Population, 1,000,000. Mozambique extends from Cape Delgado to Delagoa Bay, and up the lower Zambesi, but only a few isolated points are actually occupied. Area, 80,000 square miles. Population, 600,000.

### FRENCH COLONIES.

Equatorial France comprises the Gaboon and Ogowe-Congo regions, which, as defined at the Berlin Conference, have an

## THE WORLD AND THE UNIVERSE.

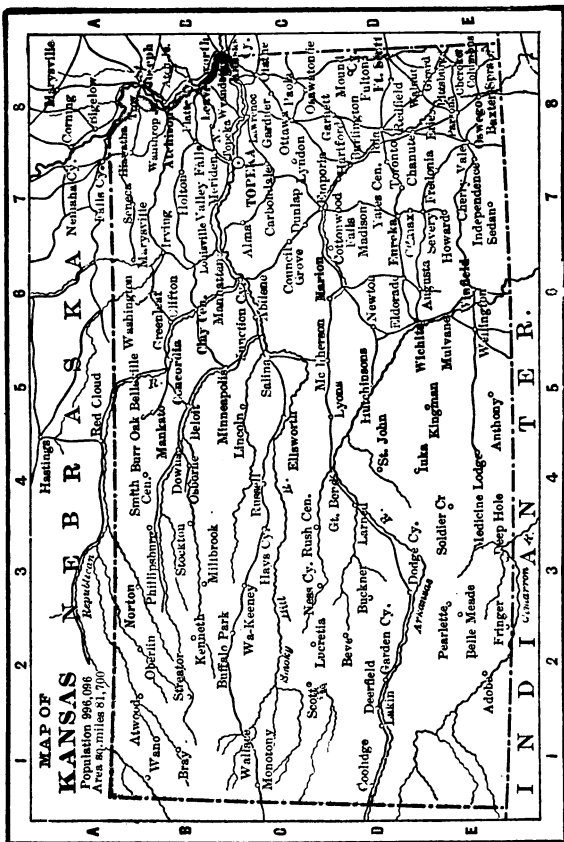
area of 174,000 square miles ; with about 1,700,000 inhabitants. Imports (Gaboon), 1883, \$840,000 ; exports, \$1,480,000.

### GERMAN COLONIES.

On the southwest coast Luderitz Land comprises all the land between the Cunene and Orange Rivers (with the exception of Walvisch Bay), and the interior lands acquired by treaty. Area, 200,000 square miles, with about 236,000 inhabitants.

**EGYPT.**—Previous to 1884 the Khedive claimed authority over territories extending southward as far as the Equator. But within the last few years the inhabitants of these equatorial provinces have rebelled against the authority of the Egyptian Government. As a result these districts have been abandoned, and Akashe, above Wady Halfa, about 800 miles up the Nile from Cairo, has been provisionally agreed upon as the boundary of Egypt on the south. On the north it is limited by the Mediterranean Sea ; on the east by Arabia and the Red Sea ; and on the west by Tripoli and the Libyan Desert. Religion—500,000 Copts, descendants of the old Egyptians, who are Christians ; 91,000 foreigners, also Christians ; rest Mohammedan. Government—Egypt is nominally a vassal state of the Porte, to which it pays a yearly tribute of £695,792, but practically it is independent under the rule of an hereditary Khedive or Viceroy. The administration is now carried on by native Ministers, subject to the ruling of the Khedive, and under the supervision of England. A Legislative Council consisting of 30 members has recently been formed, but its power is very limited. Education—Numerous elementary and secondary schools are found throughout the country, from which the pupils pass to special colleges.

**THE SUEZ CANAL.**—From remote ages the Isthmus of Suez has been traversed by a canal following nearly the line of the present one ; nothing certain, however, seems to be known as to who was its first constructor, but the credit is generally given to Pharaoh Necho, who reigned about 600 B.C. It, in course of time, got silted up with sand, but was cleared out by Trajan in the second century A.D., and again in 767. The Emperor Napoleon desired to reconstruct the canal, and had the isthmus surveyed, but nothing was done till M. Ferdinand de Lesseps, in 1854, obtained permission from the Viceroy of Egypt to construct a canal, uniting the Mediterranean and Red Seas. A company was formed to carry out his views, two-fifths of the capital being furnished by the Viceroy, and the remainder in Europe, chiefly in France. The work was commenced in 1860, and on September 28, 1869, M. Lesseps sailed in a small steamer through it. The canal runs north and south from Port Said to



**KANSAS** ranks fifth among the States in cattle, corn and rye, seventh in hay, ninth in hogs, horses, wheat and coal, twenty-first in population. The first settlers in Kansas were Americans. Admitted to the Union in 1861.



**KENTUCKY** ranks first in tobacco, fourth in malt and distilled liquors, sixth in hogs, seventh in corn, eighth in rye, coal, mules and population. First settlers, English, Boonesboro, 1775. Admitted to the Union, 1792. **TENNESSEE** ranks second in peanuts, third in mules, sixth in tobacco, seventh in copper and hogs, ninth in corn and cotton, twelfth in population. First settlers, English, Fort London, 1757. Admitted to Union, 1796.

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Suez; the length from sea to sea is 99 miles, with a width of 327 feet for 77 miles, and of 196 for the remaining 22 miles; the depth is 26 feet. In November, 1875, the British Government purchased from the Khedive the original shares held by him for £3,976,582. It is now proposed to widen the canal to 166 metres. The canal has reduced the distance from London to India from 11,379 miles to 7,628, a saving of 36 days on the voyage by the Cape. The number of vessels that passed through the canal in 1886 was 3,100. The tonnage, 8,183,313; the receipts £2,241,095.

**MAURITIUS.**—An island lying in the Indian Ocean, and a possession of Great Britain, 500 miles east of Madagascar, includes within its government, as dependencies, the Seychelles Group, Rodriguez, and Diego Garcia Islands, and about seventy other islets. Area—713 square miles (with dependencies, 1,025 square miles.) Population—1887, 368,415. Religion—108,000 Roman Catholics and 8,000 Protestants. The Government is administered by the Governor, aided by an Executive Council of 5 members, and a Legislative Council of 27 members. Education—One college with 145 students, and 140 primary schools, attended by 15,792 pupils in 1886. Government grant in 1886, £42,943.

**ST. HELENA.**—A solitary island situated in the South Atlantic, 760 miles from the nearest land, Ascension. Area—47 square miles. Population—1883, 5,085. It is controlled for Great Britain by a Governor, aided by an Executive Council of 4 members.

## NORTH AMERICA

Forms the northern and larger part of the New World; the greater portion of it is almost entirely confined to the north temperate zone. Greatest length, 4,400 miles. Greatest breadth, 3,800 miles. The outline, more especially in the north, where it takes the form of an archipelago of islands, is very much intersected and broken by the numerous inlets of the sea. Excluding Arctic America and Greenland (1,338,500 square miles) the area is about 8,000,000 square miles. In a continent extending over about 65 degrees of latitude and nearly twice as many of longitude, great varieties of climate are necessarily met with. While the Pacific shores have generally a milder climate than those of the Atlantic, the average temperature of the continent is lower than that of corresponding latitudes in the Old World.

**BRITISH NORTH AMERICA.**—Within the Dominion of Canada is included all the land lying north of the United States, with the exception of Alaska, Newfoundland, and Labrador. Exclusive of the Arctic Islands, the total area is 3,420,777 square miles. Population—1881 (census), 4,324,810. 1889 (estimated), 5,000,000. French, 1,298,930; Irish, 957,403; English, 881,300;

## THE WORLD AND THE UNIVERSE.

Scotch, 699,863; Germans, 254,320; Indians (1885), 129,525. Religion—No state church. In 1881, there were 1,791,982 Roman Catholics; 2,422,285 Protestants (Presbyterians, 676,165; Church of England, 574,818; Methodists, 1,042,980); Jews, 2,393. Government—Executive authority vested in the British Crown, and exercised in its name by a Governor-General, aided by a Privy Council. Legislative, vested in the Parliament, composed of the Senate with 78 members, and the House of Commons with 215 members. Education—24 colleges with 2,000 students. In 1884, there were 730 private and high schools with 88,593 pupils, and 15,000 public and elementary schools with 904,600 pupils.

**BRITISH COLUMBIA**, situated on the west coast of North America, comprises the territory between the Rocky Mountains and the Pacific Coast, together with Vancouver Island and Queen Charlotte Islands. Area—341,305 square miles. Population—Estimated, 1886, 60,000. Government—Lieutenant-Governor and Executive Council of 4 members, together with the Legislative Assembly of 25 members. Education—Twelve high and superior schools with 2,283 pupils, and 71 public schools with 2,188 pupils.

**NEW BRUNSWICK** has an area of 27,174 square miles. Population, 1881—321,233 (1576 Indians). Government—Administered by a Lieutenant-Governor, assisted by an Executive Council, a Legislative Council of 18 members, and a Legislative Assembly of 41 members. Education—Besides King's College at Fredericton, and numerous grammar schools, there were, in 1886, 1,515 public schools with 61,802 pupils.

**MANITOBA**, formerly the Red River Settlement, was formed into a distinct province in 1870, and admitted into the Confederation in the same year. It is situated in the center of the continent. Area—60,520 square miles. Population—1881, 65,954 (1886, 108,640). Government—Administered by a Lieutenant-Governor, assisted by an Executive Council of 5 members and a Legislative Assembly of 35 members. Education—Nine high schools with 400 pupils, and 394 elementary schools with 12,694 pupils.

**NORTH-WEST TERRITORY.**—This province comprises nearly the whole of British North America from the boundary of the United States to the most northerly part of the continent, and from the western shores of Hudson Bay to the Rocky Mountains, with a total area of 2,553,337 square miles, and an estimated population of 79,293, of whom 25,000 are Indians.



**LOUISIANA** ranks first among the States in sugar and molasses, third in rice, seventh in cotton, ninth in salt, twenty-second in population. The first settlement was in 1699, by French, at Iberville. Admitted to the Union in 1812.



**MAINE** ranks fifth among the States in buckwheat and copper, eighth in hops and potatoes, eleventh in hay, twenty-seventh in population. The first settlers were French, at Bristol, 1625. Admitted to the Union in 1820.



## THE WORLD AND THE UNIVERSE.

Out of this vast territory, in 1882, the Dominion Government formed four provisional districts: Assiniboia, Saskatchewan, Alberta, Athabasca. The Government is vested in a Lieutenant-Governor and a Council of 20. Both Assiniboia and Alberta are traversed by the Canadian Pacific Railway, and settlement is rapidly taking place along its route.

**NOVA SCOTIA.**—Nova Scotia, a peninsula of North America on its east side, forms with the island of Cape Breton one of the provinces which constitute the Dominion of Canada. Area—20,907 square miles. Population, 1881—440,572, (2138 Indians). Government—Administered by a Lieutenant-Governor, aided by an Executive Council, a Legislative Council of 21 members, and a Legislative Assembly of 38 members. Education—There are 6 colleges, the best endowed being King's College at Windsor, several high schools, and 2,111 public schools attended by 86,858 pupils in 1886.

**PRINCE EDWARD ISLAND.**—Prince Edward Island lies in the southern part of the Gulf of St. Lawrence, between New Brunswick and Cape Breton, to the north of Nova Scotia, from which it is separated by Northumberland Strait. Area—2,133 square miles. Population, 1881—108,891 (323 Indians). Government—Vested in a Lieutenant-Governor and an Executive Council, a Legislative Council of 13 members, and a Legislative Assembly of 30 members. Education—20 high and superior schools with 831 pupils, and 437 public schools attended by 22,414 pupils in 1886.

**NEWFOUNDLAND.**—The island of Newfoundland forms a British province, distinct as yet from the Dominion of Canada. Its Government extends over the mainland strip of Labrador, from which it is separated by the Strait of Belle Isle, 12 miles across. Area—42,000 square miles. Population, 1884—193,121. Religion—Church of England, 69,000; Roman Catholics, 75,254; Wesleyans, 48,787. Government—The Government is administered by a Governor, appointed by the British Crown, assisted by an Executive Council (not exceeding 7 members), a Legislative Council (not exceeding 15 members), and a House of Assembly consisting of 36 representatives. Education—1885, 402 aided schools attended by 27,322 pupils.

**LABRADOR,** a dependency of Newfoundland, forms the most easterly part of America. The coast is mainly frequented for the sake of the seal and cod, and when those fisheries are in progress, the population of the country (normally about 4000) is raised to upwards of 25,000.

**THE UNITED STATES.**—On the north the United States

## THE WORLD AND THE UNIVERSE.

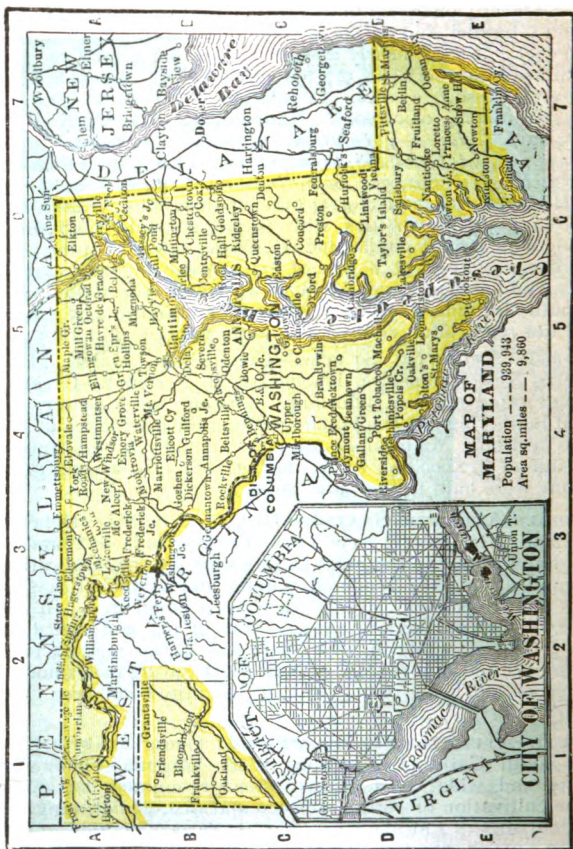
are bounded by British North America; on the west by the Pacific Ocean; on the south by Mexico, the Gulf of Mexico, and Florida Channel; and on the east by the Atlantic Ocean and New Brunswick. Extent nearly as large as Europe; total area, 3,602,990 square miles. Alaska, 577,390 square miles. Rivers and lakes occupy 38,400 square miles. Population—1880 census, 50,497,057 (1889, estimated, 60,000,000). Nationalities, 1880—*Native born*, 43,475,840; *Colored population*, 6,580,793; *Indians*, 339,098; *Chinese*, 105,465; *Germans*, 1,966,742; *Irish*, 1,854,571; *Canadians*, 717,157; *English*, 662,676; *Scandinavians*, 440,262; *Scotch*, 170,136; *Welsh*, 83,302; and 519,254 other nationalities. Education—There are 365 universities with 69,728 students, 1,617 private schools with 160,137 pupils, and 11,169,923 scholars in the public schools, maintained at a cost of \$110,000,000 in 1885; 4,923,431 adults could not read and 6,239,958 were unable to write in 1880. In South Carolina, Louisiana, Alabama and Georgia 45 per cent. could not read; adult colored people, 70 per cent. illiterate.

**NORTH ATLANTIC STATES.**—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.—Great forests and rapid streams, affording abundant water-power, have placed lumbering and shipbuilding among the foremost industries of this section. Maine alone produces annually sawed timber to the value of \$12,000,000, while, during 1882, 120 vessels of 61,296 tons were built in the same State.

**MIDDLE ATLANTIC STATES.**—Dist. of Columbia, Delaware, Maryland, New Jersey, New York, Pennsylvania.—Abundance of coal and iron, and the great facilities for internal and external communication have rendered mining and manufacturing the chief industries and largely developed commerce. In 1885, 48,345,680 tons of coal and 3,813,212 tons of pig and rolled iron were produced; while in 1880 there was 90,600 manufactories. The import and export trade of New York during 1886 amounted to \$733,000,000, being 56 per cent. of the entire commerce of the country.

**SOUTH ATLANTIC STATES.**—Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia.—The warm climate and wide coast plains offer pre-eminent advantages for the cultivation of cotton, tobacco and rice, while orange culture flourishes in Florida. In 1880, 95,380,000 pounds of rice; in 1882, 124,079,780 pounds of tobacco and 2,121,000 bales of cotton; and, in 1885, over 200,000,000 oranges were raised in these States.

**NORTHERN DIVISION EAST OF THE MISSISSIPPI.**—In this division we include Illinois, Indiana, Kentucky, Michigan, Ohio and Wisconsin. These States possess great natural



**MARYLAND** ranks second among the States in fisheries, fourth in coal, seventh in tobacco, eighth in copper, ninth in iron ore, twenty-second in population. The first settlement was at St. Mary, by English, in 1634. One of the thirteen original States.



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advantages of fertile soil and large deposits of valuable minerals, so that agriculture, grazing, manufacturing and mining have become wide-spread industries. According to the agricultural returns for 1886, 569,703,000 bushels of corn, 161,881,000 bushels of wheat, and 235,693,000 bushels of oats were grown; while, in 1887, there were 3,705,660 horses and 8,693,147 cattle. In 1882, 256,047,310 pounds of tobacco were produced. During 1885, 19,587,190 tons of coal and 1,562,566 tons of iron were produced. In 1880 the manufacturing establishments numbered 68,320.

**NORTHERN DIVISION WEST OF THE MISSISSIPPI.**—In this are included Iowa, Kansas, Minnesota, Nebraska, and Missouri, Dakota and the Indian Territory. Industries similar to above. 611,107,000 bushels of corn, 160,006,000 bushels of wheat, and 217,798,000 bushels of oats were grown during 1886, while the farm stock included, in 1887, 3,290,569 horses and 11,518,417 cattle. 7,885,610 tons of coal and 67,955 tons of iron were produced in 1885. In 1880 the manufactories numbered 19,720.

**SOUTHERN DIVISION.**—Alabama, Mississippi, Tennessee, Arkansas, Louisiana and Texas. The warm and moist climate and extreme fertility of the soil have made the growth of cotton, rice and sugar-cane the foremost industries. During 1882, 4,794,000 bales of cotton were raised, while Louisiana, Mississippi and Texas produced 25,000,000 pounds of rice in 1880, and Louisiana alone 145,986 hogsheads of sugar in 1886-87.

**HIGHLAND STATES AND TERRITORIES.**—This region, embracing Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming, has a cool and remarkably dry climate, and the valleys afford fine pasture, but the rich mines of gold and silver in the mountains render mining the chief occupation. During 1885 gold valued at \$14,260,000, silver valued at \$48,910,000, and 2,471,397 tons of coal were produced.

**THE PACIFIC COAST.**—This section embraces California, Oregon and Washington Territory. This district with the above mentioned is, perhaps, the richest in metals on the globe. Besides mining, the chief occupation, the forests of the outer slope furnish inexhaustible supplies of timber, so that lumbering has become a distinctive industry. The most wealthy and populous State is California, which, besides its immense mineral deposits, possesses great fertility of soil in its valleys, so that agriculture and the cultivation of fruits, both of the temperate and semi-tropical zones, are in a most advanced condition. During 1885 gold valued at \$13,620,000, silver valued at \$2,580,000, and 448,095 tons of coal were produced, while, in 1886, the wheat crop of California alone amounted to 36,165,000 bushels, and the

## THE WORLD AND THE UNIVERSE.

lumber produce of Puget Sound (Washington) to \$1,200,000 in 1880.

**MEXICO.**—Area, 751,177 square miles. Population, 10,460,703 in 1884, 20 per cent. white race, 43 per cent. natives of mixed race, and 37 per cent. Indians. Religion—Prevailing religion, Roman Catholic, though by law there is toleration of all other religions. 62 Protestant churches with over 20,000 adherents. Government—A confederate republic. Executive, the President. Legislative, the Congress, consisting of the House of Representatives with 227 members, and the Senate with 56 members. Army—20,635 men (peace footing); 164,000 men (war footing). Navy—7 small vessels. Education—1884, 8,986 elementary schools with nearly 500,000 pupils, and 138 higher schools with 17,200 scholars. Government grant, \$3,400,000. Finance—Revenue, 1886–87 (estimated), \$30,625,000; expenditures, 1886–87 (estimated), \$26,700,000; national debt, \$162,737,650. Imports—1885–86, \$41,285,000. Exports—1885–86, \$51,500,000. Chief articles exported, 1884–85—Precious metals, \$13,425,000; textile fibers, \$4,630,000. Industries—102,240 men employed in mining. Between 1821 and 1880 silver to the value of \$900,000,000, and gold to the value of \$4,841,000 were produced. 88 cotton factories with 12,846 employes.

**CENTRAL AMERICA AND WEST INDIES.**—The Central American States comprise that portion of the narrow belt of land adjoining North and South America which extends from the southern borders of Mexico, south of the Yucatan peninsula, to the beginning of the Isthmus of Panama—Guatemala, San Salvador, Nicaragua, Honduras, Costa Rica and British Honduras. The West Indies are an immense number of islands and islets, some of them mere rocks, extending from 10° to 27° N. lat. and from 55° 30' to 85° W. long. They are divided physically into three distinct groups, the Bahamas, the Greater Antilles and the Lesser Antilles. But politically they are, with a few exceptions, divided between European powers—Spain, Great Britain, France, Holland and Denmark.

## SOUTH AMERICA

Forms the southern and lesser part of the great American Peninsula, and is joined to North America by the Isthmus of Panama, which, at its narrowest part, is only 30 miles broad. Greatest length, Pt. Gallinas to Cape Horn, 4,700 miles. Greatest breadth, Cape Branco to Cape Burica, 3,200 miles. The outline is regular and forms a continuous though curved line, not greatly serrated or broken into by the sea, except at the south, where a large number of islands occur. The coast line measures 16,500 miles, or 420 miles of surface to each mile of coast. Area





**MICHIGAN** ranks first among the States in copper, lumber and salt second in iron ore, third in buckwheat and wool, fifth in hops and potatoes, sixth in wheat and barley, seventh in agricultural implements, eighth in miles of railway, ninth in population. First settlement, by French, at Detroit, 1650. Admitted to the Union, 1837.



**MINNESOTA** ranks fourth among the States of the Union in wheat and barley, eighth in oats and hay, twenty-sixth in population. The first settlement in Minnesota was by Americans, Red River, 1812. Admitted into the Union in 1858.



## THE WORLD AND THE UNIVERSE.

—7,000,000 square miles, nearly twice that of Europe, or one-eighth of the entire land surface of the globe. The number of inhabitants, according to the latest estimates, amounts to over 32,000,000. With two-thirds of its area within the torrid zone, the average temperature in South America is necessarily higher than that of North America. The moisture is also very great, attains its maximum in the extreme north, and is everywhere greater on the eastern side of the Andes than on the western.

**COLOMBIA.**—The Republic of Colombia, as the former Republic of New Granada is now styled, is a federal republic of nine departments, in the northwest part of South America. The most western of these departments is the isthmus connecting the two continents. There is no state religion, natives and foreigners alike being guaranteed the most complete freedom of worship; in Bogota and other towns Protestant churches have been opened. Government—Republican. Executive—The President, assisted by seven Ministers. Legislative—The Congress, consisting of the Senate and House of Representatives, the former composed of 27 members, the latter of 66. Each department administers its own finances, etc. The forces comprise a standing army of 3,000 men. Education—Considerable attention is paid to education, there being as many as 1,800 schools giving instruction to 75,000 pupils, while an "Escuela Normal," or college for the instruction of teachers, is provided for in the capital of each department. Panama Canal—The canal in course of construction across the isthmus, between Panama and Colon, will have a total length of 47 miles; average depth, 28 feet; minimum width, 72 feet.

**VENEZUELA.**—Religion—The Roman Catholic is the state religion, but there is toleration of all others, though they are not permitted any external manifestations. Only one per cent. of the population in 1884 were whites. Government—Republican. Executive—The President, assisted by six Ministers and the Federal Council of 16 members. Legislative—The Congress, composed of the Senate and the House of Representatives, the former with 24 senators, the latter with 52 representatives. The Provinces or States of the Republic have each their own executive and legislature. Education—There were (1884) two universities, 19 federal colleges with 2,538 students; 19 private colleges and normal schools with 907 students, and 1,794 schools attended by 95,000 pupils.

**GUIANA.**—Guiana, in its widest sense, certainly embraces the whole of the Sierra Parime, thus including districts at present belonging to Venezuela and Brazil; but the name is now generally restricted to the colonial possessions of Britain, Holland and France, in this part of the world. British Guiana is by far

## *THE WORLD AND THE UNIVERSE.*

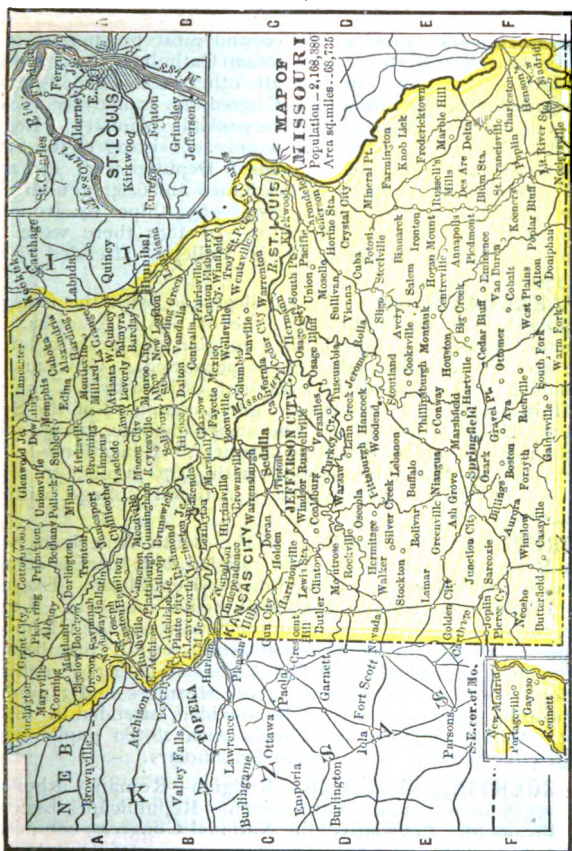
the most flourishing, agriculturally and commercially, of the three colonies. The population embraces 7,538 origines. Government—The Governor, appointed by the British Crown, assisted by the Court of Policy of nine members, and a Combined Court containing, in addition to those nine, six financial representatives.

**ECUADOR.**—Included within the Republic of Ecuador are the Galapagos Islands, situated in the Pacific about 730 miles due west of the coast. According to the constitution the religion of the Republic is Roman Catholic to the exclusion of every other. Government—Executive, the President. Legislative, the Congress of two houses, the first consisting of two senators for each province, and the second of deputies elected by the people. Army—About 1,600 men. Education—Only about 75,000 of the population can read or write.

**PERU.**—The population of Peru includes about 350,000 uncivilized Indians. By the terms of the constitution the Roman Catholic is declared the religion of the state, and the public exercise of any other is prohibited. At the census of 1876 there were 5,087 Protestants and 498 Jews. Government—Republican. Executive, the President, assisted by a Cabinet of 5 Ministers. Legislative, the Senate and House of Representatives, the former composed of deputies (1 for every 30,000 inhabitants), and the latter of representatives nominated by the provincial electoral colleges of each department. During the war with Chili the army was raised to about 19,000 men; it now numbers about 5,900. The fleet consists of 2 cruisers and 2 small troop ships. Education—By a return of 1880 the facilities provided for education consist of 1 university at Lima, 5 lesser universities, 45 higher class schools and 650 public and private schools with 32,555 pupils.

**BOLIVIA.**—Bolivia is the most centrally situated state of South America, and, with the exception of Paraguay, is the only one without a seaboard. Religion—The mixed races forming the population are regarded as at least nominally Christian. Government—Republican. Executive, the President, assisted by a Vice-President and a cabinet of 5 Ministers. Legislative, the Congress, consisting of the Senate and the House of Representatives, both elected by universal suffrage. The standing army consists of 1,013 officers and 2,000 men, and costs upwards of two-thirds of the public revenue. Education—According to a report issued in 1884, the schools and universities were attended by only 12,000 pupils and students, or about 5 per cent. of the population of school age. There are four universities.





**MISSOURI** ranks first in mules, third in oxen, hogs, corn and copper, fifth in population, sixth in iron ore, wool and horses, seventh in oats, eighth in wheat and tobacco, ninth in miles of railway, sheep and potatoes. First settlement, French, at Ste. Genevieve, 1764. Admitted into the Union in 1821

## THE WORLD AND THE UNIVERSE.

**BRAZIL.**—The most extensive and most prosperous of the South American States. The Roman Catholic is the established religion of the state, though all other sects are tolerated. Government—Constitutional and hereditary monarchy. Executive, the Emperor, assisted by a responsible Ministry. Legislative, the General Legislative Assembly, consisting of the Senate with 60 members, and the Chamber of Deputies with 125 members. Army—Peace footing, 15,048 men and 6,847 gendarmerie. War footing, 32,000 men. Navy—65 ships (9 ironclads) manned by 5,788 men. Education—In 1885 there were 5,520 public, 957 private schools, and 286 "colleges" attended by 435,997 pupils in all.

**PARAGUAY** is one of the smallest, and, with the exception of Bolivia, the only landlocked state of South America. The Roman Catholic is the established religion of the state, but the free exercise of other religions is permitted. Government—Republican. Executive, the President, assisted by a Cabinet of 5 Ministers. Legislative, the Congress, composed of the Senate and the House of Deputies. The armed defense forces consist of 500 men and a fleet of 3 river steamers. Education—In 1885 there were 99 state public schools, with 3,676 pupils; 50 private schools with 1,424 pupils, and a national college with 150 students.

**URUGUAY** is the smallest of the South American States. The Roman Catholic is the state religion, but there is complete toleration of all sects. Government—Republican. Executive, the President, assisted by a council of five members. Legislative, the parliament, composed of the Senate and the Chamber of Representatives, the former consisting of 19 members, the latter of 53. The defense forces consist of 3,540 regulars, a national guard of 20,000 men, 5 river steamers and 3 gunboats. Education—One university at Montevideo, attended in 1886 by 1,453 students; 341 public schools with 28,380 pupils, and, in 1885, 429 private schools with 20,899 scholars.

**ARGENTINE REPUBLIC.**—Religion—Roman Catholic, but all creeds are tolerated. Government—Republican. Executive, the President. Legislative, the National Congress, composed of the Senate with 30 members, and the House of Deputies with 86. Army—7,324 men, exclusive of the national guard of about 350,000 men. Navy—39 ships (3 ironclads) manned by 2,150 men. Education—In 1885 there were 2 universities attended by 880 students, various superior schools, 15 lyceums with 3,189 pupils, and, in 1886, 3,415 elementary schools with 180,768 scholars.

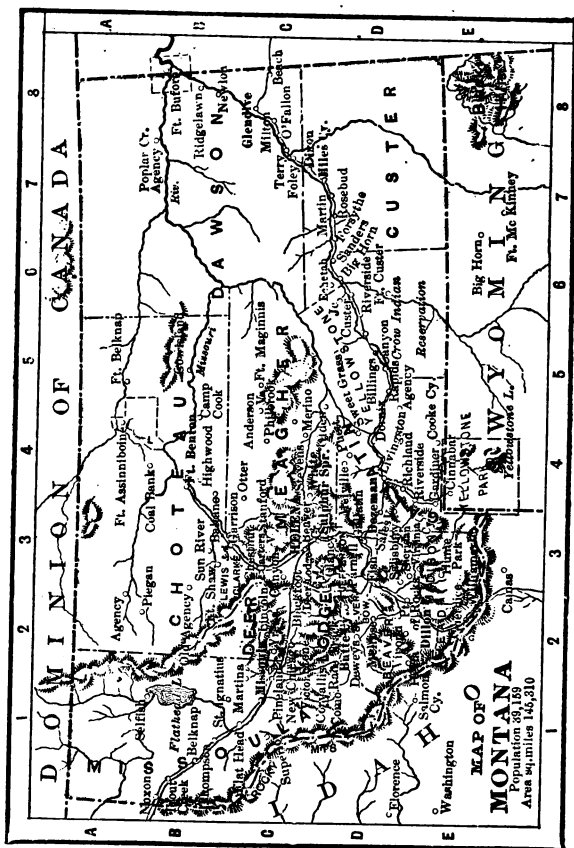
**CHILI.**—Religion—Roman Catholic, but all other religions

## POLAR EXPLORATION.

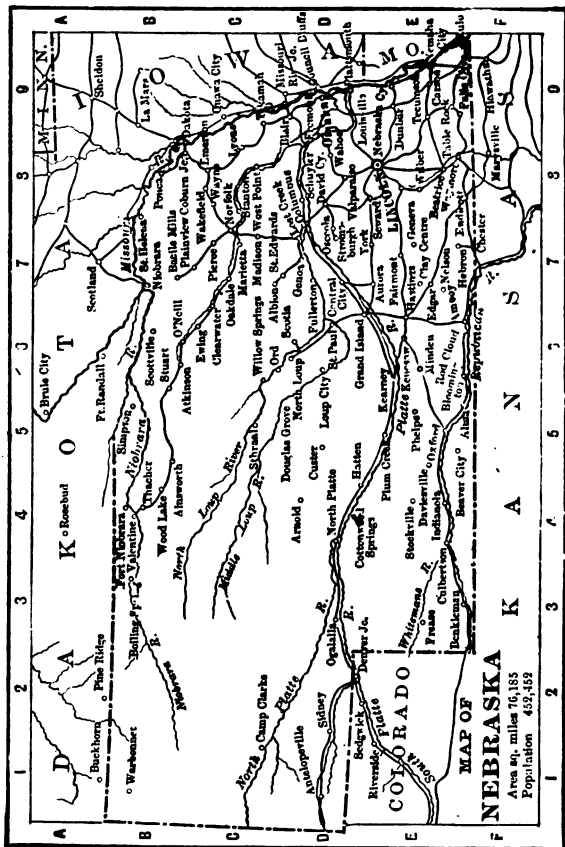
are protected. Government—Republican. Executive, the President. Legislative, the Senate of 43 members, and the Chamber of Deputies of 126. Army—6,510 regulars, and the national guard of 53,741 men. Navy—32 ships (3 ironclads) with 2,385 men. Education—One university and numerous lyceums attended, in 1886, by 5,900 students; 532 private schools with 28,242 pupils, and 862 public primary schools with 78,810 scholars.

### Polar Exploration

Really begins with the search for the northeast passage. With this object Willoughby left England with three ships in 1553. Nova Zembla was sighted, but the voyage was disastrous, two ships were lost and with them perished the first leader of an Arctic expedition. In 1556 another expedition, under Burroughs, set out for the same purpose, but without success. The northeast passage proving impracticable, efforts were directed to the northwest. Frobisher sailed in 1576 and discovered Meta Incognita, a part of the present Baffin Land. Ten years later Davis navigated the strait which bears his name, advancing northward to  $72^{\circ}$  N. Barents, a Dutch seaman, made three voyages to the northeast. In 1596, on his third voyage, he discovered Spitzbergen and reached a latitude of  $80^{\circ}$  N. Sailing thence to Nova Zembla he doubled the north point and wintered on the eastern side of the island. Hudson, between the years 1607–1610, made four voyages; two of these were to the northeast, and a latitude of  $80^{\circ} 23'$  N. was attained. On his third voyage he discovered Hudson River, and in the following year, 1610, the strait and bay since named after him. These discoveries were supplemented in 1616, when Baffin sailed up Davis Strait into Baffin's Bay. During the eighteenth century Russian explorations made great progress. The entire northern coast of Siberia was gradually discovered, while, in 1728, Bering examined the strait between Asia and America, and in 1741 Liakov, a Russian merchant, the islands now known as New Siberia. The numerous expeditions of the present century have driven the unknown regions of the north into comparatively narrow limits. In 1819 Parry passed through Lancaster Sound and wintered on Melville Island; eight years later he sailed to Spitzbergen, and traveling northward on sledges, reached  $82^{\circ} 45'$  N. Of the numerous expeditions which left England in search of Franklin, who had sailed in 1845, that under M'Clure in 1850 was, perhaps, the most important, since the northwest passage was then traversed for the first time. In 1853 Kane considerably extended knowledge in Smith Sound, while in 1874 the Austrian expedition discovered the archipelago of Franz Josef Land. The Nares expedition of 1875–6, passing through Smith



**MONTANA** in 1880 ranked fourth among the States and Territories in silver, fifth in gold, fifteenth in cattle, forty-seventh in miles of railway and forty-fourth in population. First settlement, by Americans, in 1852. Organized as a Territory in 1864; admitted to the Union in 1889. Population, 1888, estimated, 175,000.



**NEBRASKA** ranks eighth among the States of the Union in corn and barley, ninth in rye, thirtieth in population. Nebraska was first settled by immigrants from the other States. Admitted into the Union in 1867.



## *THE WORLD'S LARGEST CITIES.*

Sound, wintered farther north than any previous expedition, and a sledding party under Markham reached  $83^{\circ} 20'$ , a latitude only surpassed by that of Lockwood, in the Greeley expedition, who, in 1882, stood under  $83^{\circ} 24'$  N. Finally, in 1878, Norden-skjöld performed in the "Vega" that northeast passage which Willoughby had attempted over 300 years before.

### **The World's Largest Cities.**

The following information is often inquired for, and as it may be useful in many cases for reference, we have compiled a table of the largest cities in the world, with their populations as stated by the latest authorities. In the absence of any official census, the Chinese cities have simply to be estimated, and, of course, must be accepted as an approximation only. We have not given any city whose population is below 500,000, though there are many we could enumerate which closely approach that figure. It will be seen that in the 35 cities tabulated below there are 32,510,319 souls, or nearly the population of the British Isles, a fact which cannot be grasped in a moment by any ordinary intellect.

Aitichi, Japan	1,332,050	Moscow, Russia	611,974
Bangkok, Siam	500,000	New York, N. Y.	1,400,000
Brooklyn, N. Y.	771,000	Paris, France	2,269,023
Berlin, Prussia	1,122,330	Pekalonga, Java	505,204
Calcutta, India	766,298	Pekin, China	800,000
Canton, China	1,500,000	Philadelphia, Pa.	850,000
Changchoofoo, China	1,000,000	St. Petersburg, Russia	766,964
Chicago, Ill.	1,000,000	Sartania, Japan	962,917
Constantinople, T'k'y.	700,000	Sian, China	1,000,000
Foo-choo, China	630,000	St. Louis, Mo.	500,000
Glasgow, Scotland	514,048	Tat-Seen-Loo, China	500,000
Hang-Chow-foo, Ch'a.	600,000	Tien-Tsin, China	950,000
Hang-Tcheon, China	800,000	Tokio, Japan	987,887
Han-Kow, China	600,000	Tschautchau-fu, Ch'a	1,000,000
King-te-Chiang, Chi'a	500,000	Tsin-Tchoo, China	800,000
Liverpool, England	573,000	Vienna, Austria	726,105
London, England	3,955,819	Woo-chang, China	800,000
Madrid, Spain	500,900		

**ESTIMATED AGE OF THE EARTH.**—According to geological computation, the minimum age of the earth since the formation of the primitive soils is 21,000,000 years—6,700,000 years for the primordial formations, 6,400,000 years for the primary age, 2,300,000 years for the secondary age, and 460,000 years for the tertiary age, and 100,000 since the appearance of man upon the globe.

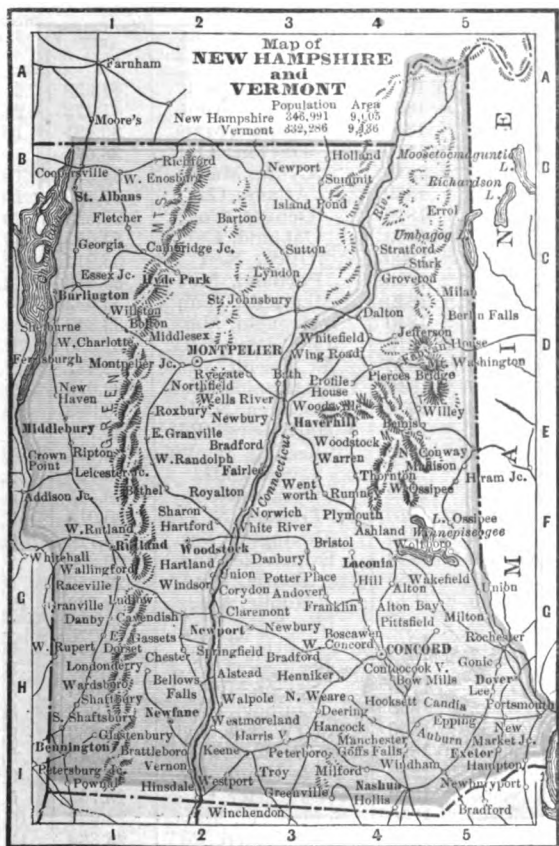
# Cities of the U. S. of Over 20,000 Population.

SETTL'D	POPULATION FIRST RECORDED IN CENSUS	CITIES AND TOWNS.	POPULATION, 1880.	INCREASE 1870 to 1880.
1623	33,131 in 1790	.. New York, N. Y..	1,206,299	264,007
1683	42,520 " 1790	.. Philadelphia, Pa..	847,170	173,148
1636	1,603 " 1790	... Brooklyn, N. Y..	566,663	170,564
1830	4,479 " 1840	.... Chicago, Ill. ...	503,185	204,208
1630	18,038 " 1790	.... Boston, Mass. ...	362,839	112,313
1764	1,600 " 1810	.... St. Louis, Mo. ...	350,518	39,651
1682	13,503 " 1790	.. Baltimore, Md. ...	332,313	64,959
1788	750 " 1800	.... Cincinnati, O. ...	255,139	38,900
1776	500 " 1840	.. San Francisco, Cal.	233,959	84,486
1718	5,500 " 1790	.. New Orleans, La. ...	216,090	24,672
1796	547 " 1810	.. Cleveland, O. ...	160,146	67,317
1754	1,565 " 1800	... Pittsburgh, Pa. ...	156,389	70,313
1801	1,508 " 1810	.... Buffalo, N. Y. ...	155,134	37,420
1791	3,210 " 1800	.. Washington, D.C.	147,293	38,094
1666	6,507 " 1820	.... Newark, N. J. ...	136,508	31,449
1778	200 " 1790	.. Louisville, Ky. ...	123,758	23,005
1802	3,072 " 1840	.. Jersey City, N. J. ...	120,722	38,176
1701	770 " 1810	.... Detroit, Mich. ...	116,340	36,763
1835	1,700 " 1840	.. Milwaukee, Wis. ...	115,587	44,147
1636	6,380 " 1790	.. Providence, R. I. ...	104,857	35,953
1614	3,498 " 1790	.... Albany, N. Y. ...	90,758	21,336
1810	1,502 " 1820	.. Rochester, N. Y. ...	89,366	26,980
1645	1,839 " 1840	... Allegheny, Pa. ...	78,682	25,502
1819	75 " 1820	.. Indianapolis, Ind. ...	75,056	26,812
1737	3,761 " 1790	.... Richmond, Va. ...	63,600	12,562
1638	4,049 " 1800	.. New Haven, Ct. ...	62,882	12,042
1826*	6,474 " 1830	.. Lowell, Mass. ...	59,475	18,547
1713	2,095 " 1800	.. Worcester, Mass. ...	58,291	17,186
1752	3,895 " 1810	.... Troy, N. Y. ...	56,747	10,282
1830	4,418 " 1860	.. Kansas City, Mo. ...	55,785	23,525
1630	2,115 " 1790	.. Cambridge, Mass. ...	52,669	13,035
1787	1,814 " 1820	.. Syracuse, N. Y. ...	51,792	8,741
1812	1,450 " 1820	.... Columbus, O. ...	51,647	20,373
1792	7,596 " 1840	.... Paterson, N. J. ...	51,031	17,452
1832	1,222 " 1840	.... Toledo, O. ...	50,137	18,553
1680	16,359 " 1790	.. Charleston, S. C. ...	49,984	1,028
1803	6,738 " 1840	.. Fall River, Mass. ...	48,961	22,195
1849	13,066 " 1870	.. Minneapolis, Minn.	46,877	33,821
1844	3,000 " 1853	... Scranton, Pa. ...	45,850	10,758
1779	5,566 " 1830	.. Nashville, Tenn. ...	43,350	17,485
1748	2,385 " 1800	.. Reading, Pa. ...	43,278	9,348
1732	5,268 " 1820	.. Wilmington, Del. ...	42,478	11,637
1635	3,955 " 1810	.... Hartford, Ct. ...	42,015	4,835

\*Date of separation from an older city.



**NEVADA**, in the census of 1880, ranks second among the States in gold, fourth in silver, thirty-eighth in population. First settled by Americans, immigrants from the other States, in 1850. Admitted to the Union in 1864.



**NEW HAMPSHIRE** ranks third in manufacture of cotton goods, fifteenth in potatoes, thirty-first in population. First settlement, English, at Little Harbor, 1623. **VERMONT** ranks fourth in copper, seventh in hops and buckwheat, thirty-second in population. First settlement, English, Fort Dummer, 1764. Vermont and New Hampshire are two of the thirteen original States.

**Cities of the U. S. of Over 20,000 Population.—(Continued.)**

SETTL'D	POPULATION FIRST RECORDED IN CENSUS	CITIES AND TOWNS.	POPULATION, 1880.	INCREASE 1870 TO 1880.
1628	1,987 in 1830	.... Camden, N. J. . .	41,659	21,614
1838	1,112 " 1850	.... St. Paul, Minn. . .	41,473	21,443
1847*	8,282 " 1850	.... Lawrence, Mass. . .	39,151	10,230
1796	383 " 1810	.... Dayton, O. . . .	38,678	8,205
1629	9,367 " 1840	.... Lynn, Mass. . . .	38,274	10,041
1845	2,572 " 1850	.... Atlanta, Ga. . . .	37,409	15,620
1858	4,759 " 1870	.... Denver, Col. . . .	35,629	30,870
1852	1,543 " 1860	.... Oakland, Cal. . . .	34,555	24,055
1758	2,972 " 1820	.... Utica, N. Y. . . .	33,914	5,110
1632	2,244 " 1790	.... Portland, Me. . . .	33,810	2,397
1820	3,360 " 1840	.... Memphis, Tenn. . .	33,592	†6,634
1635	2,767 " 1810	.... Springfield, Mass. .	33,340	6,637
1730	615 " 1810	.... Manchester, N. H. .	32,630	9,094
1846	19,565 " 1870	.... St. Joseph, Mo. . .	32,431	12,866
1833	1,000 " 1840	.... Grand Rapids, Mich. .	32,016	15,509
16—	2,668 " 1850	.... Hoboken, N. J. . .	30,999	10,702
1726	1,472 " 1800	.... Harrisburg, Pa. . .	30,762	7,658
1774	914 " 1810	.... Wheeling, W. Va. . .	30,737	11,457
1733	5,166 " 1800	.... Savannah, Ga. . . .	30,709	2,474
1854	1,833 " 1860	.... Omaha, Neb. . . .	30,518	14,435
1680	3,003 " 1810	.... Trenton, N. J. . . .	29,910	7,036
1815	745 " 1830	.... Covington, Ky. . . .	29,720	5,215
1817	250 " 1840	.... Evansville, Ind. . .	29,280	7,450
1819	5,095 " 1850	.... Peoria, Ill. . . . .	29,259	6,410
1702	1,500 " 1820	.... Mobile, Ala. . . . .	29,132	†2,902
1664	2,500 " 1840	.... Elizabeth, N. J. . .	28,229	7,397
1795	3,412 " 1840	.... Erie, Pa. . . . .	27,737	8,091
1639	110 " 1790	.... Bridgeport, Ct. . .	27,643	8,674
1628	7,921 " 1790	.... Salem, Mass. . . .	27,563	3,446
1822	6,902 " 1850	.... Quincy, Ill. . . . .	27,268	3,216
1794	4,232 " 1850	.... Fort Wayne, Ind. . .	26,880	9,162
1787*	3,947 " 1820	.... New Bedford, Mass. .	26,845	5,525
1816	2,000 " 1840	.... Terre Haute, Ind. .	26,042	9,939
1718	6,663 " 1840	.... Lancaster, Pa. . . .	25,769	5,536
1842*	3,540 " 1850	.... Somerville, Mass. .	24,933	10,248
1772	2,732 " 1850	.... Wilkesbarre, Pa. . .	23,339	13,165
1843	502 " 1850	.... Des Moines, Ia. . . .	22,408	10,373
1833	1,300 " 1840	.... Dubuque, Ia. . . . .	22,254	3,820
1837	13,818 " 1870	.... Galveston, Tex. . .	22,248	8,435
1705	8,478 " 1820	.... Norfolk, Va. . . . .	21,966	2,737
1793	5,626 " 1840	.... Auburn, N. Y. . . .	21,924	4,699
1850*	3,245 " 1850	.... Holyoke, Mass. . . .	21,915	11,182
1735	4,000 " 1830	.... Augusta, Ga. . . . .	21,891	6,502

\* Date of separation from an older city. † Decrease.

## Cities of the U. S. of Over 20,000 Population.—(Concluded.)

SETTL'D	POPULATION FIRST RECORDED IN CENSUS	CITIES AND TOWNS.	POPULATION, 1880.	INCREASE 1870 TO 1880.
1836	600 in 1840	....Davenport, Ia..	21,831	1,793
1738*	2,290 " 1840	...Chelsea, Mass...	21,782	3,235
1748	6,690 " 1820	...Petersburg, Va.	21,656	2,706
1830	6,820 " 1850	...Sacramento, Cal.	21,420	5,137
1638	6,042 " 1830	....Taunton, Mass...	21,213	2,584
1720	6,000 " 1840	...Oswego, N. Y.	21,116	206
1847	2,854 " 1870	Salt Lake City, Utah	20,768	7,914
1803	2,349 " 1840	... Springfield, O ..	20,730	8,078
1876	1,583 " 1860	.. Bay City, Mich..	20,693	13,629
1714	3,488 " 1850	San Antonio, Tex.	20,550	8,294
1790	4,791 " 1840	.... Elmira, N. Y ..	20,541	4,678
—	15,087 " 1870	... Newport, Ky.	20,433	5,346
1690	10,006 " 1840	Poughkeepsie, N. Y.	20,207	127

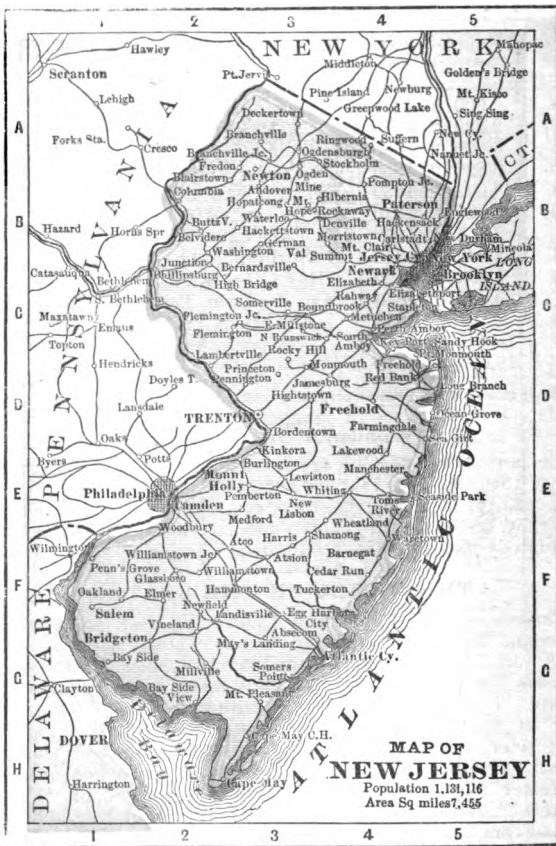
\*Date of separation from an older city.

### The Wonderful Growth of Chicago.

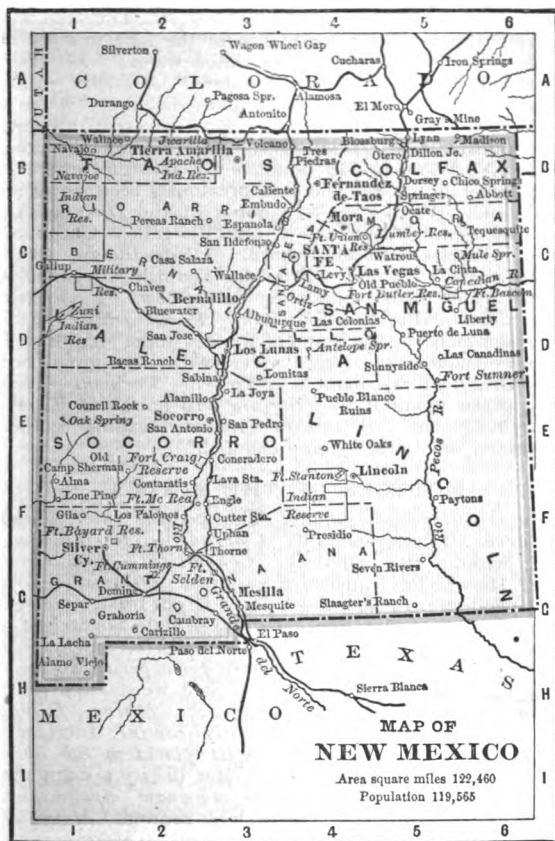
The population of Chicago in 1830, was 70; 1840, 4,853; 1845, 12,088; 1850, 29,963; 1855, 60,227; 1860, 112,172; 1865, 178,900; 1870, 298,977; 1872, 364,377; 1880, 503,185; 1884, (estimated) 675,000; 1885, (estimated), 727,000; 1886, (estimated) 750,000; 1887, (estimated) 760,000; 1889, (estimated) 1,000,000.

### THE NAMES OF THE STATES.

*Alabama*—Indian; meaning "Here we rest." *Arkansas*—"Kansas," the Indian name for "smoky water," with the French prefix "arc," bow or bend in the principal river. *California*—*Caliente Fornalla*, Spanish for "hot furnace," in allusion to the climate. *Colorado*—Spanish; meaning "colored," from the red color of the Colorado river. *Connecticut*—Indian; meaning "long river." *Delaware*—Named in honor of Lord Delaware. *Florida*—Named by Ponce de Leon, who discovered it in 1512, on Easter Day, the Spanish *Pascua de Flores*, or "Feast of Flowers." *Georgia*—In honor of George II. of England. *Illinois*—From the Indian "illini," men, and the French suffix "ois," together signifying "tribe of men." *Indiana*—Indian land. *Iowa*—Indian; meaning "beautiful land." *Kansas*—Indian; meaning "smoky water." *Kentucky*—Indian; for "at the head of the river;" or "the dark and bloody ground." *Louisiana*—In honor of Louis XIV. of France. *Maine*—From the province of Maine, in France. *Maryland*—In honor of Henrietta Maria, queen of Charles I. of England. *Massachusetts*—The place of the great hills (the blue hills southwest of Boston).



**NEW JERSEY** ranks first in silk goods, zinc and fertilizing marl, fourth in iron ore, fifth in iron and steel, sixth in buckwheat, manufactures and soap, seventh in rye, nineteenth in population. First settlement, by Dutch, at Bergen, 1620. One of the thirteen original States.



**NEW MEXICO** ranks eighth in silver, eleventh in gold, nineteenth in sheep, twenty-second in cattle, thirty-sixth in miles of railway, fortieth in population. First settlement, by Spaniards, at Santa Fe, 1537. Organized as a territory, 1850. Population in 1885, territorial census, 134,141.



## NAMES OF THE STATES.

*Michigan*—The Indian name for a fish weir. The lake was so called from the fancied resemblance of the lake to a fish trap. *Minnesota*—Indian; meaning "sky-tinted water." *Mississippi*—Indian; meaning "great father of waters." *Missouri*—Indian; meaning "muddy." *Nebraska*—Indian; meaning "water valley." *Nevada*—Spanish; meaning "snow-covered," alluding to the mountains. *New Hampshire*—From Hampshire county, England. *New Jersey*—In honor of Sir George Carteret, one of the original grantees, who had previously been governor of Jersey Island. *New York*—In honor of the Duke of York. *North and South Carolina*—Originally called Carolina, in honor of Charles IX. of France. *Ohio*—Indian; meaning "beautiful river." *Oregon*—From the Spanish "oregano," wild marjoram, which grows abundantly on the coast. *Pennsylvania*—Latin: meaning Penn's woody land. *Rhode Island*—From a fancied resemblance to the island of Rhodes in the Mediterranean. *Tennessee*—Indian, meaning "river with the great bend." *Texas*—Origin of this name is unknown. *Vermont*—French; meaning green mountain. *Virginia*—In honor of Elizabeth, the "Virgin Queen." *Wisconsin*—Indian; meaning "gathering of the waters," or "wild rushing channel."

## MOTTOES OF THE STATES.

*Arkansas*—*Regnant populi*: The peoples rule. *California*—*Eureka*: I have found it. *Colorado*—*Nil sine numine*: Nothing without the Divinity. *Connecticut*—*Qui transtulit sustinet*: He who has transferred, sustains. *Delaware*—Liberty and Independence. *Florida*—In God is our trust. *Georgia*—Wisdom, Justice, Moderation. *Illinois*—State Sovereignty and National Union. *Iowa*—Our liberties we prize, and our rights we will maintain. *Kansas*—*Ad astra per aspera*: To the stars through rugged ways. *Kentucky*—United we stand, divided we fall. *Louisiana*—Union and Confidence. *Maine*—*Dirigo*: I direct. *Maryland*—*Crescite et multiplicamini*: Increase and multiply. *Massachusetts*—*Ense petit placidam sub libertate quietem*: By her sword she seeks under liberty a calm repose. *Michigan*—*Si quæris peninsulam amœnam circumspice*: If thou seekest a beautiful peninsula, look around. *Minnesota*—*L'Etoile du Nord*: The Star of the North. *Missouri*—*Solus populi suprema lex esto*: Let the welfare of the people be the supreme law. *Nebraska*—Popular Sovereignty. *Nevada*—*Volens et potens*: Willing and able. *New Jersey*—Liberty and Independence. *New York*—*Excelsior*: Higher. *Ohio*—*Imperium in imperio*: An empire within an empire. *Oregon*—*Alis volat propriis*: She flies with her own wings. *Pennsylvania*—Virtue, Liberty, Independence. *Rhode Island*—Hope.

## GEOGRAPHICAL NICKNAMES.

*South Carolina*—*Animis opibusque parati*: Ready with our lives and property. *Tennessee*—Agriculture, Commerce. *Vermont*—Freedom and Unity. *Virginia*—*Sic semper tyrannis*: So be it ever to tyrants. *West Virginia*—*Montani semper liberi*: The mountaineers are always free. *Wisconsin*—Forward. *United States*—*E pluribus unum*: From many, one. *Annuit cæptis*: God has favored the undertaking; *Novus ordo seclorum*: A new order of ages. The first named on one side of the great seal, the other two on the reverse.

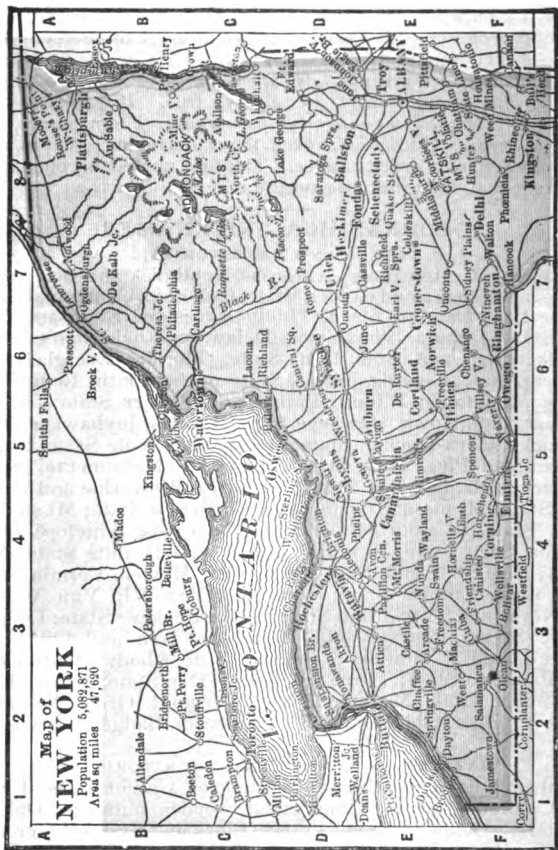
## GEOGRAPHICAL NICKNAMES.

### STATES AND TERRITORIES.

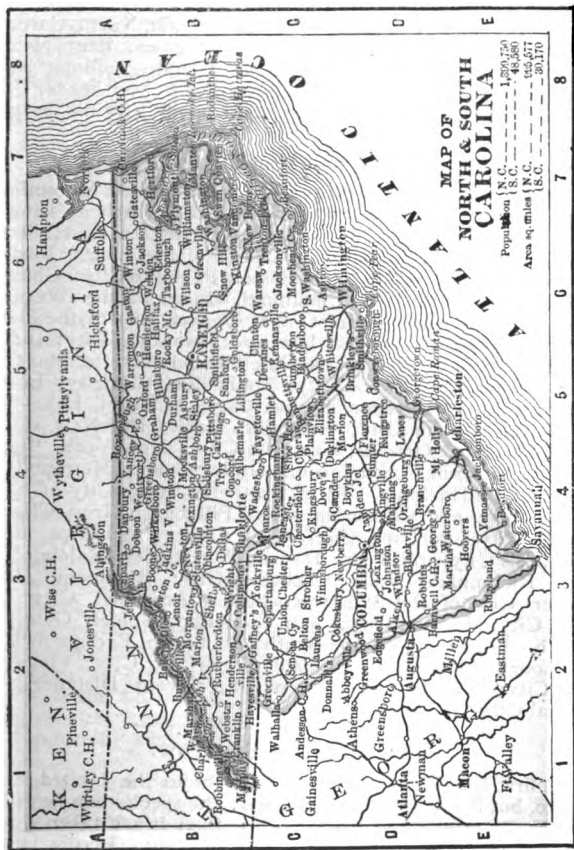
Alabama, Cotton State; Arkansas, Toothpick and Bear State; California, Eureka and Golden State; Colorado, Centennial State; Connecticut, Land of Steady Habits, Freestone State and Nutmeg State; Dakota, Sioux State; Delaware, Uncle Sam's Pocket Handkerchief and Blue Hen State; Florida, Everglade and Flowery State; Georgia, Empire State of the South; Idaho, Gem of the Mountains; Illinois, Prairie and Sucker State; Indiana, Hoosier State; Iowa, Hawkeye State; Kansas, Jayhawker State; Kentucky, Corn-cracker State; Louisiana, Creole State; Maine, Timber and Pine Tree State; Maryland, Monumental State; Massachusetts, Old Bay State; Michigan, Wolverine and Peninsular State; Minnesota, Gopher and North Star State; Mississippi, Eagle State; Missouri, Puke State; Nebraska, Antelope State; Nevada, Sage State; New Hampshire, Old Granite State; New Jersey, Blue State and New Spain; New Mexico, Vermin State; New York, Empire State; North Carolina, Rip Van Winkle, Old North and Turpentine State; Ohio, Buckeye State; Oregon, Pacific State; Pennsylvania, Keystone, Iron and Oil State; Rhode Island, Plantation State and Little Rhody; South Carolina, Palmetto State; Tennessee, Lion's Den State; Texas, Lone Star State; Utah, Mormon State; Vermont, Green Mountain State; Virginia, Old Dominion; Wisconsin, Badger and Copper State.

### NATIVES OF STATES AND TERRITORIES.

Alabama, lizards; Arkansas, toothpicks; California, gold-hunters; Colorado, rovers; Connecticut, wooden nutmegs; Dakota, squatters; Delaware, muskrats; Florida, fly-up-the-creeks; Georgia, buzzards; Idaho, fortune seekers; Illinois, suckers; Indiana, hoosiers; Iowa, hawkeyes; Kansas, jayhawkers; Kentucky, corn-crackers; Louisiana, creoles; Maine, foxes; Maryland, clam-humpers; Massachusetts, Yankees; Michigan, wolverines; Minnesota, gophers; Mississippi, tadpoles; Missouri, pukes; Nebraska, bugeaters; Nevada, sage-hens; New Hampshire, granite boys; New Jersey, blues, or clam-catchers; New Mexico,



**NEW YORK** ranks first in manufactures, population, printing and publishing, hops, hay, potatoes, buckwheat and milch cows; second in salt, silk goods, malt and distilled liquors, miles of railway and barley; third in agricultural implements, iron ore, iron and steel, oats and rye, fourth in wool. First settlement, by the Dutch, at New Amsterdam (now New York City), 1614. One of the original States.



**NORTH CAROLINA** ranks first in tar and turpentine, second in copper, third in peanuts and tobacco, fourth in rice, ninth in cotton, fifteenth in population. First settlers, English, Cowan River, 1650. **SOUTH CAROLINA** ranks first in rice and phosphates, fifth in cotton, twentieth in population. First settlers, English, Ashley River, 1670. North and South Carolina are both original States.

## GEOGRAPHICAL NICKNAMES.

Spanish Indians; New York, Knickerbockers; North Carolina, tarheels; Ohio, buckeyes; Oregon, hard cases; Pennsylvania, pennamites, or leather-heads; Rhode Island, gunflints; South Carolina, weazles; Tennessee, whelps; Texas, beef-heads; Utah, polygamists; Vermont, green-mountain boys; Virginia, beagles; Wisconsin, badgers.

### NICKNAMES OF CITIES.

Atlanta, Gate City of the South; Baltimore, Monumental City; Bangor, Lumber City; Boston, Modern Athens, Literary Emporium, City of Notions, and Hub of the Universe; Brooklyn, City of Churches; Buffalo, Queen of the Lakes; Burlington (Iowa), Orchard City; Charleston, Palmetto City; Chicago, Prairie, or Garden City; Cincinnati, Queen of the West and Porkopolis; Cleveland, Forest City; Denver, City of the Plains; Detroit, City of the Straits; Hartford, Insurance City; Indianapolis, Railroad City; Keokuk, Gate City; Lafayette, Star City; Leavenworth, Cottonwood City; Louisville, Falls City; Lowell, Spindle City; McGregor, Pocket City; Madison, Lake City; Milwaukee, Cream City; Nashville, Rock City; New Haven, Elm City; New Orleans, Crescent City; New York, Empire City, Commercial Emporium, Gotham, and Metropolis of America; Philadelphia, City of Brotherly Love, City of Penn, Quaker City, and Centennial City; Pittsburgh, Iron City and Smoky City; Portland (Me.), Hill City; Providence, Roger Williams's City, and Perry Davis's Pain Killer; Raleigh, Oak City; Richmond (Va.), Cockade City; Richmond (Ind.), Quaker City of the West; Rochester, Aqueduct City; Salt Lake City, Mormon City; San Francisco, Golden Gate; Savannah, Forest City of the South; Sheboygan, Evergreen City; St. Louis, Mound City; St. Paul, North Star City; Vicksburg, Key City; Washington, City of Magnificent Distances, and Federal City.

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### The English Sparrow.

The first English sparrow was brought to the United States in 1850, but it was not until 1870 that the species can be said to have firmly established itself. Since then it has taken possession of the country. Its fecundity is amazing. In the latitude of New York and southward it hatches, as a rule, five or six broods in a season, with from four to six young in a brood. Assuming the average annual product of a pair to be twenty-four young, of which half are females and half males, and assuming further, for the sake of computation, that all live, together with their offspring, it will be seen that in ten years the progeny of a single pair would be 275,716,983,698.

## U. S. STATISTICS IN A NUTSHELL.

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**T**HE NEXT census of the United States, when completed, will probably show a **POPULATION** of nearly 60,000,000. The census of 1880 counted 50,155,783, of whom 17,392,099 were earners.

The combined **WEALTH** of the country in 1880 amounted to over \$50,000,000,000 — about \$880 per head, or \$2,600 per worker. Half of this was in lands and houses. This half was made up of farms, \$10,197,000,000; residence and business real-estate, \$9,881,000,000; public buildings, churches, etc., not taxed, \$2,000,000,000. One-eighth was railroads (\$5,536,000,000); another eighth, household furniture and supplies (\$5,000,000,000); the other quarter, live stock and farm tools (\$2,406,000,000); mines and quarries (\$781,000,000); telegraphs, ships and canals (\$419,000,000); specie (\$612,000,000); miscellaneous (\$650,000,000); and the stock of products and imports (\$6,160,000,000).

The annual **PRODUCT** or **EARNINGS** of the nation are given by the census of 1880 as \$8,500,000,000. One-tenth of this is used on farms. The product is very unevenly divided. An even division would give about \$450 per year to each earner, or less than 45 cents per day for each person. But it has been reckoned that in 1880 fifty persons had an average income of \$1,000,000 each per year; 2,000, \$100,000; 100,000, \$10,000; a million, \$1,000; 14,000,000 under \$400 per year.

The chief wastes are as follows :

1. Drink. The "liquor bill" of this country, at the price paid dram-shops, is estimated at from \$474,000,000 up, of which a large part is worse than waste.

2. Fire. The loss by fire each year now exceeds \$100,000,000, of which the \$50,000,000 paid back by insurance companies is none the less loss. The expenses of insurance companies are \$35,000,000 in addition, and for fire departments, \$25,000,000 more.

3. Crime and pauperism. The census reported 59,255 criminals in jail, and 67,067 paupers in poor-houses. These are by no means all. Their support costs over \$12,500,000 per year, but the full loss by crime runs probably toward fifty millions.

4. Waste of food. We consume now about \$500,000,000 worth of food, of which probably 10 per cent is wasted by extravagance, bad cooking, etc., or \$50,000,000.

5. Strikes and lack of employment. There were in one year (1880) 762 strikes recorded, of which 226 are known to have resulted in a loss of \$3,700,000 unearned wages. Still greater is the loss by lack of employment for men willing to work.



**OHIO** ranks first in agricultural implements and wool, second in petroleum, iron and steel, third in population, wheat, sheep, coal, malt and distilled liquors; fourth in printing and publishing, salt and miles of railway; fifth in milch cows, hogs, horses, hay, tobacco, iron ore and manufactures. First settled, by English, at Marietta, 1788. Admitted into the Union, 1803.





## FACTS ABOUT OUR COUNTRY.

The following gives the area of our country, and when and how the territory was acquired :

	Square Miles.
Territory ceded by England in 1783 .....	815,615
Louisiana acquired from France in 1803 .....	930,928
Florida acquired from Spain in 1821 .....	59,268
Texas admitted into the Union in 1845 .....	237,504
Oregon, by treaty in 1846 .....	280,425
California taken from Mexico in 1845 .....	649,762
Arizona, from Mexico by treaty in 1854 .....	27,500
Alaska, from Russia by treaty in 1867 .....	577,390
Total square miles .....	3,578,392

## INCREASE OF POPULATION IN UNITED STATES.

	Natural.	Immigration.	Total per Cent.
1831-40 .....	28.02	4.65	32.67
1841-50 .....	26.19	9.68	35.87
1851-60 .....	24.20	11.38	35.58
1861-70 .....	15.38	7.25	22.63
1871-80 .....	22.78	7.29	30.07

The increase of population since 1730 has averaged 32 per cent. every 10 years. At this rate there will be eighty-eight millions in 1900.

The increase of population in Europe since the fourteenth century is as follows, according to Mulhall (thousands omitted):

	1380.	1480.	1580.	1680.	1780.	1880.
British Isles ...	2,360	3,700	4,600	5,532	9,561	35,004
France .....	11,240	12,600	14,300	18,800	25,100	37,400
Germany .....	600	800	1,000	1,400	5,460	45,260
Russia .....	1,200	2,100	4,300	12,600	26,800	84,440
Austria .....	2,300	9,500	16,500	14,000	20,200	37,830
Italy .....	8,400	9,200	10,400	11,500	12,800	28,910
Spain .....	7,500	8,800	8,150	9,200	9,960	16,290
Total ....	33,600	46,700	59,250	73,032	109,881	285,134

## GOVERNMENT SALARIES.

The salary of the President of the United States is \$50,000 a year, the Vice President, \$8,000; Cabinet officers, \$8,000. Senators, \$5,000 and mileage; Congressmen, \$5,000 and mileage. Chief Justice Supreme Court, \$10,500; associate Justices, \$10,000. The diplomats get good pay: Ministers to Germany,

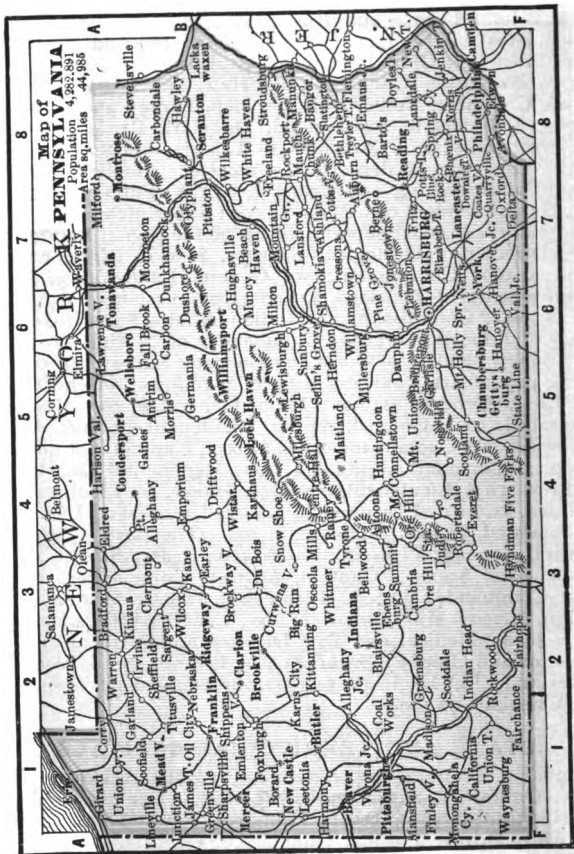
## U. S. STATISTICS IN A NUTSHELL.

Great Britain, France and Russia, \$17,500; Ministers to Brazil, China, Austria-Hungary, Italy, Mexico, Japan and Spain, \$12,000; Ministers to Chili, Peru and Central America, \$10,000; Ministers to Argentine Confederation, Hawaiian Islands, Belgium, Hayti, Colombia, Netherlands, Sweden, Turkey and Venezuela, \$7,500; Ministers to Switzerland, Denmark, Paraguay, Bolivia and Portugal, \$5,000; Ministers to Liberia, \$4,000. The heads of the Government departments receive: Superintendent of Bureau of Engraving and Printing, \$4,500; Public Printer, \$4,500; Superintendent of Census, \$5,000; Superintendent of Naval Observatory, \$5,000; Superintendent of the Signal Service, \$4,000; Director of Geological Surveys, \$6,000; Director of the Mint, \$4,500; Commissioner of General Land Office, \$4,000; Commissioner of Pensions, \$3,600; Commissioner of Agriculture, \$3,000; Commissioner of Indian Affairs, \$3,000; Commissioner of Education, \$3,000; Commander of Marine Corps, \$3,500; Superintendent of Coast and Geodetic Survey, \$6,000.

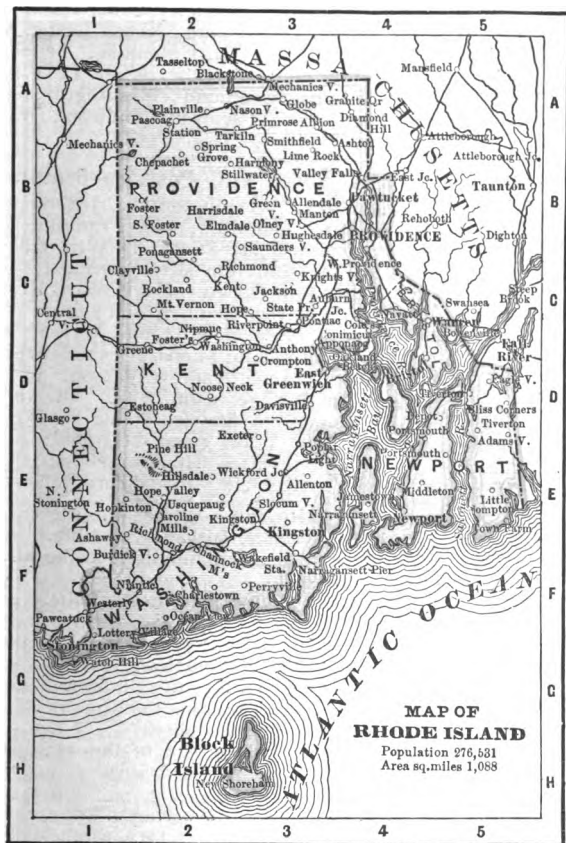
The pay of army officers is fixed as follows: General, \$13,500; Lieut.-General, \$11,000; Major-General, \$7,500; Brigadier-General, \$5,500; Colonel, \$3,500, Lieutenant-Colonel, \$3,000; Major, \$2,500; Captain, mounted, \$2,000; Captain, not mounted, \$1,800; Regimental Adjutant, \$1,800; Regimental Quartermaster, \$1,800; 1st Lieutenant, mounted, \$1,600; 1st Lieutenant, not mounted, \$1,500; 2d Lieutenant, mounted, \$1,500; 2d Lieutenant, not mounted, \$1,400; Chaplain, \$1,500. The navy salaries are: Admiral, \$13,000; Vice-Admiral, \$9,000; Rear-Admiral, \$6,000; Commodore, \$5,000; Captain, \$4,500; Commander, \$3,500; Lieut.-Commander, \$2,800; Lieutenant, \$2,400; Master, \$1,800; Ensign, \$1,200; Midshipman, \$1,000; Cadet Midshipman, \$500; Mate, \$900; Medical and Pay Director and Medical and Pay Inspector and Chief Engineer, \$4,400; Fleet Surgeon, Fleet Paymaster and Fleet Engineer, \$4,400; Surgeon and Paymaster, \$2,800; Chaplain, \$2,500.

## STATE AND TERRITORIAL CAPITALS.

Alabama, Montgomery; Arizona, Prescott; Arkansas, Little Rock; California, Sacramento; Colorado, Denver; Connecticut, Hartford; North Dakota, Bismarck; South Dakota, Pierre; Delaware, Dover; Florida, Tallahassee; Georgia, Atlanta; Idaho, Boise City; Illinois, Springfield; Indiana, Indianapolis; Indian Territory, Tahlequah; Iowa, Des Moines; Kansas, Topeka; Kentucky, Frankfort; Louisiana, Baton Rouge; Maine, Augusta; Maryland, Annapolis; Massachusetts, Boston; Michigan, Lansing; Minnesota, St. Paul; Mississippi, Jackson; Missouri, Jefferson City; Montana, Helena; Nebraska, Lincoln; Nevada, Carson City; New Hampshire, Concord;



**PENNSYLVANIA** ranks first in rye, iron and steel, petroleum, coal; second in population, manufactures, buckwheat, potatoes, printing and publishing; third in milch cows, hay and miles of railway; fourth in oats and tobacco; fifth in silk goods, wool, malt and distilled liquors; sixth in salt, copper and agricultural implements; eighth in horses and sheep. First settlement, English, Philadelphia, 1682. One of the thirteen original States.



**RHODE ISLAND** ranks second among the States of the Union in cotton, flax and linen goods, thirty-third in population. The first settlement was by the English at Providence in 1636. One of the thirteen original States.

## U. S. STATISTICS IN A NUTSHELL.

New Jersey, Trenton; New Mexico Territory, Santa Fe; New York, Albany; North Carolina, Raleigh; Ohio, Columbus; Oregon, Salem; Pennsylvania, Harrisburg; Rhode Island, Newport and Providence; South Carolina, Columbia; Tennessee, Nashville; Texas, Austin; Utah Territory, Salt Lake City; Vermont, Montpelier; Virginia, Richmond; Washington, Olympia; West Virginia, Wheeling; Wisconsin, Madison; Wyoming Territory, Cheyenne.

### Portraits on Bank Notes and Postage Stamps.

On United States notes—\$1, Washington; \$2, Jefferson; \$5, Jackson; \$10, Webster; \$20, Hamilton; \$50, Franklin; \$100, Lincoln; \$500, General Mansfield; \$1,000, DeWitt Clinton; \$5,000, Madison; \$10,000, Jackson. On silver certificates—\$10, Robert Morris; \$20, Commodore Decatur; \$50, Edward Everett; \$100, James Monroe; \$500, Charles Sumner, and \$1,000, W. L. Marcy. On gold notes—\$20, Garfield; \$50, Silas Wright; \$100, Thomas H. Benton; \$500, A. Lincoln; \$1,000, Alexander Hamilton; \$5,000, James Madison; \$10,000, Andrew Jackson.

Those which appear on postage stamps are: On 10-cent stamp, the head of Jefferson, from life-size statue by Powers; 6-cent, Lincoln, from bust by Volk; 5-cent, Garfield; 4-cent, Jackson; 2-cent, Washington, after Houdin's bust; 1-cent, Franklin, from profile bust by Rubicht. Postal card, Jefferson.

**SYMBOLIC MEANING OF COLORS.**—White was the emblem of light, religious purity, innocence, faith, joy and life. In the judge, it indicates integrity; in the sick, humility; in the woman, chastity.

Red, the ruby, signifies fire, divine love, heat of the creative power, and royalty. White and red roses express love and wisdom. The red color of the blood has its origin in the action of the heart, which corresponds to, or symbolizes, love. In a bad sense red corresponds to the infernal love of evil, hatred, etc.

Blue, or the sapphire, expresses heaven, the firmament, truth from a celestial origin, constancy and fidelity.

Yellow, or gold, is the symbol of the sun, of the goodness of God, of marriage and faithfulness. In a bad sense yellow signifies inconstancy, jealousy and deceit.

Green, the emerald, is the color of the spring of hope, particularly of the hope of immortality and of victory, as the color of the laurel and palm.

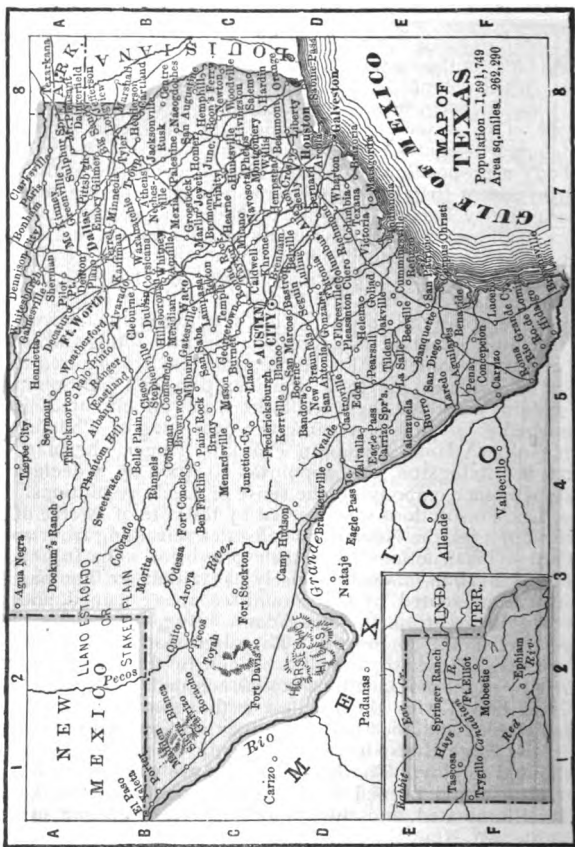
Violet, the amethyst, signifies love and truth, or passion and suffering. Purple and scarlet signify things good and true from a celestial origin.

Black corresponds to despair, darkness, earthliness, mourning, negation, wickedness and death.

## U. S. POLITICAL HISTORY IN BRIEF.

**T**HAT enthusiastic little rebel, Rhode Island, was the first of the colonies to declare itself "free from all dependence on the crown of Great Britain." This she did on May 4, 1776. The Assembly of Virginia in the same month instructed her delegates to the Continental Congress to present to that body a proposition "affirming the independence of the colonies from Great Britain." In compliance with these instructions Richard Henry Lee, of Virginia, on June 7, 1776, introduced his famous resolutions: "That these united colonies are, and of right ought to be, free and independent States; that they are absolved from all allegiance to the British crown; and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved. That it is expedient forthwith to take the most effectual measures for forming foreign alliances. That a plan of confederation be prepared and transmitted to the respective colonies for their consideration and approbation." John Adams seconded these resolutions, and an animated discussion ensued. On June 8, a committee consisting of Thomas Jefferson, John Adams, Benjamin Franklin, Roger Sherman, and Robert R. Livingston, was appointed to draw up a declaration of independence embodying the sense of Lee's resolutions. On July 2, Lee's resolutions were passed by the vote of twelve of the thirteen colonies, the New York delegates refraining from voting for want of instructions from their province. On July 3, the formal declaration, almost precisely as written by Thomas Jefferson, was presented by the committee above named, and was debated with great spirit, John Adams being the chief speaker on the part of the committee. The discussion was resumed on the morning of the 4th, and at 2 o'clock in the afternoon, after one or two slight modifications, it was adopted. The announcement was hailed with the liveliest enthusiasm. "Ring! ring!" shouted the lad stationed below to give the signal to the old bellman in the State House tower; and he did ring until the whole city shouted for joy. The King's arms were wrenched from the Court House and burned in the streets; bonfires were lighted, the city illuminated, and the exultation was prolonged far into the night. In New York City the populace hurled the leaden statute of George III. from its pedestal and molded it into bullets, and in all the great cities similar demonstrations of enthusiasm were exhibited.

The Declaration of Independence was signed August 2, 1776, when President John Hancock said, "There must be no pulling different ways, we must all hang together," to which Franklin replied, "Yes, we must all hang together, or we shall all hang separately."



**TEXAS** ranks first in cattle and cotton, second in sugar, sheep, mules and horses, sixth in miles of railway, seventh in milch cows, eighth in hogs and rice, eleventh in population. First settlement, by Spaniards, at San Antonio, in 1692. Admitted into the Union in 1845.



**UTAH** ranks third among the States and Territories in silver, tenth in gold, fifteenth in coal, thirty-fourth in miles of railway, thirty-eighth in population. First settlement, by Americans, at Salt Lake City, 1847. Organized as a Territory in 1850.



## U. S. POLITICAL HISTORY IN BRIEF.

State constitutions were adopted in the same year as follows. By New Jersey (July 2), Virginia (July 5), Pennsylvania (July 15), Maryland (Aug. 14), Delaware (Sept. 20), North Carolina (Dec. 18).

1778—Independence of United States acknowledged by France by a treaty of alliance and commerce.

1779—Naval victory of John Paul Jones.

1781—A French fleet in aid of the United States drives the British from Chesapeake Bay. Surrender of Cornwallis.

1782—Independence recognized by Holland.

1783—Independence acknowledged by Sweden, Denmark, Spain and Russia, successively. Definite treaty of peace with Great Britain, Sept. 3.

1789—Formation and adoption of the Constitution.

American politics begins properly with the close of the Revolutionary war, out of which travail this nation was born. When the British departed they left behind them thirteen separate and independent States joined together in a feeble confederation and governed as a whole, so far as they would consent to be governed at all, by the inadequate Continental Congress. The finances were in a deplorable condition; the States were jealous of each other, and of the Congress. As everything was badly defined and unsettled there were constant encroachments and abuses, and it seemed that after achieving freedom America was about to cast it away. During the war there had been two parties, the Tories, who were English in sympathy, and the Whigs, who were American to the core. These gave place to two new divisions, one of which favored a closer and lasting union in which the States should bind themselves together into a compact government—called the Federalists; and one which, while generally admitting the need for a closer and more binding union, still sought to preserve the sovereignty and independence of the States—these were known as the Anti-Federalists. Our Constitution and our form of government are the result of the two opposing forces, and its great flexibility—its perfection—is to be ascribed to the wisdom with which the fathers sought out and chose what was best in the scheme of either.

It is impossible here to do more than outline the growth of parties, but no man can be an intelligent voter who does not study the foundation of the republic. Every citizen should pursue this subject further in the pages of the *Federalist*, which argued one side of the issue, and in the writings of Thomas Jefferson, who upheld the other. It will show how high ran feeling at the time, when it is pointed out that, although the Constitution was adopted in 1787, it was ratified by but eleven States in 1788. Still this was enough to set the new nation up in business.

## U. S. POLITICAL HISTORY IN BRIEF

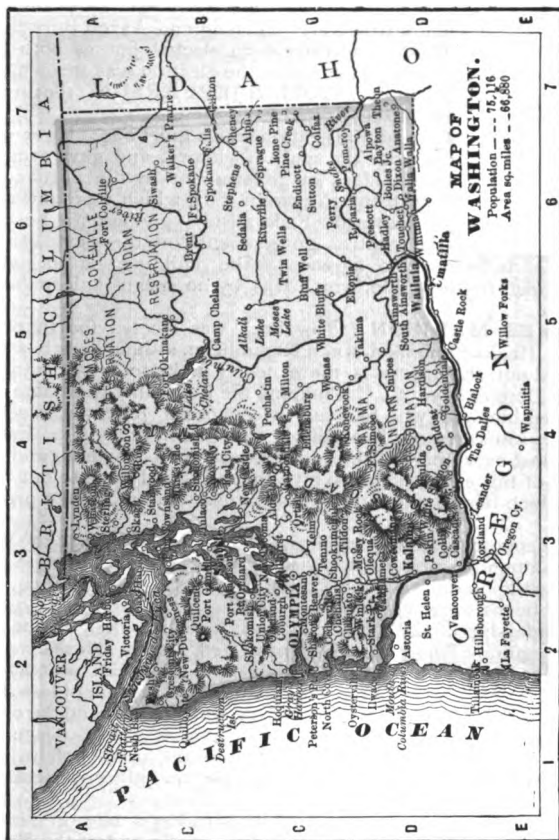
**GEORGE WASHINGTON** (1789-1797) was the unanimous choice of the electoral college, and the hero of the revolution became the first President of the United States in 1789. It is not to be imagined that even at that time the people were all of one mind about the Constitution. There is no document—not even the Bible—which is not subject to different interpretations, and the great charter of our American liberties was no exception to the rule. Parties were formed known as strict constructionists and loose constructionists, the former Federalists, the latter Anti-Federalists, the first believing in a strongly centralized government, the second jealously observant of the rights of the States. It will be found that a close analysis of the distinction made there has been and is the dividing line of American parties ever since.

Of course new issues complicated the old ones. The Anti-Federalists changed their name to the Democratic-Republican party, and warmly urged the alliance with France. In the revolution which had just ended, the French alone had first come to our aid, and on land and sea had waged war upon our common enemy. Hence there was a lively sense of gratitude to that great nation throughout the country, made none the less by the establishment of the republic, and hardly destroyed by the atrocities of the Reign of Terror. The Federalists, on the other hand, inclined toward England as the national friend, through the ties of kinship and common language. In spite of these differences of opinion, which were daily growing more bitter, there was practically no partisanship during Washington's administration. He called Federalists and Anti-Federalists into his cabinet, which was composed of men of such opposite views as Alexander Hamilton and Thomas Jefferson, and his farewell address, which every school boy has read, is full of grave warning against the evils and dangers of party spirit.

But with Washington in retirement, the contest began. The Federalists put **JOHN ADAMS** (1797-1801) in the field, and elected him in spite of the English treaty which John Jay had made and which Adams had supported. Thomas Jefferson became vice-president, because at that time the vice-presidency went to the man receiving the next largest vote for president, a system which was in force until 1804.

There were many reasons why the Federalist triumph could not be a permanent one. England was intensely unpopular, and the administration was accused of favoring that kingdom unduly. The alien and sedition laws caused an access of the public displeasure, and the party split into two sections, one following Adams, the other Hamilton. Nominations for the election were made by members of Congress; Adams and Pinkney were chosen





**WASHINGTON**, in 1880, ranked eighth among the States and Territories in gold, forty-sixth in miles of railway, forty-first in population. First settlement, by Americans, at Astoria, in 1811. Organized as a territory in 1853, and admitted into the Union in 1889.

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as the Federal standard-bearers, Jefferson and Aaron Burr as the Republican. Jefferson and Burr were elected, but as both had received the same number of votes, the election was thrown into the House, which chose **THOMAS JEFFERSON** (1801-1809) the third president of the United States.

The history of his administration was a quiet one. He refused to make the civil service the spoil of victory, and gave proof of the flexibility of his ideas of government by the purchase of Louisiana Territory from France in 1803, which was a measure tending strongly toward Federalism—giving a hostage, as it were, to the central government on the part of the States. Jefferson also agreed to the building of the great post road to the Ohio, which was by no means a Republican scheme.

**JAMES MADISON** (1809-1817) was elected fourth president. He, like Jefferson, was a Republican, although, as has been pointed out, that party is more nearly akin to what is to-day called Democracy. C. C. Pinkney, the Federalist candidate who opposed him, and who had run twice against Jefferson, received 47 electoral votes, while Madison was given 122. The Federalists lost every part of the country save New England, and one result of this election was to give that sectional tone to our politics which has to a greater or less extent endured to the present time.

The country was drifting into a war with England at the time, and the public spirit was aroused by the continual outrages perpetrated upon our sailors on the high seas by British ships. The Republicans were recognized as the fighting party, and under the leadership of Calhoun, Clay and Crawford, the War of 1812 was begun. The Federalists protested, and in Massachusetts and Connecticut the governors refused to allow the militia to go out of the State, save to repel invasion. That argument lasted but a short time, however, for the country was invaded and the city of Washington captured and burned. The treaty of peace was signed in the winter of 1814, but before the news reached this country Andrew Jackson had gained the magnificent victory of New Orleans, on January 8, 1815.

With the close of Madison's administration a new era in our politics began. The questions of Federalism and of the French or English friendship were dead, and new issues were coming up. These were the tariff, the management of finances and the development of industry. What became known as the **Era of Good Feeling** followed, which lasted from the election of **JAMES MONROE** (1817-1825) up to 1828. Upon Monroe's second election in 1821, there was no opposition to him, and he would have had the unanimous vote of the electoral college had not one

of the electors declared that that honor should be confined sacredly to Washington.

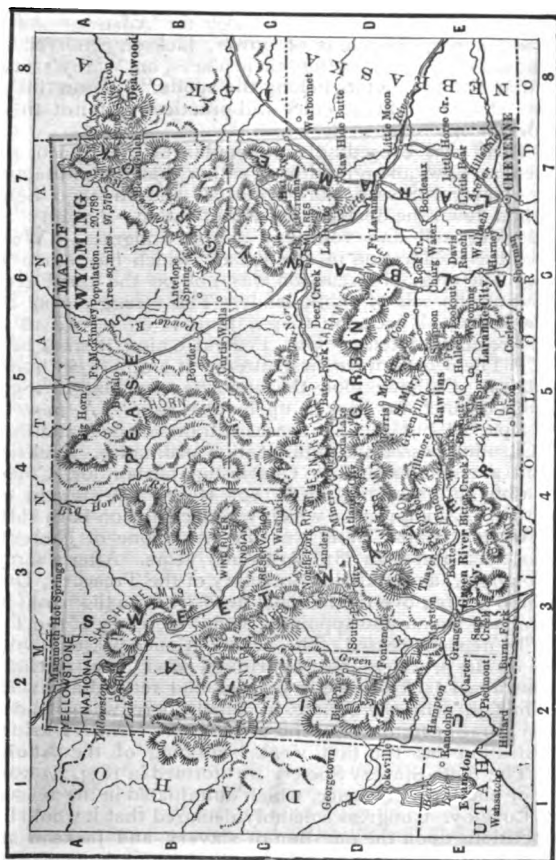
It was the **Slavery Question** which put an end to the era of good feeling, and which burned hotly, and more hotly, until it wrapped the whole land in the flames of civil war. It began with the application of Missouri for admission into the Union in 1820. Prior to that time **Mason and Dixon's Line**, which is the boundary of Maryland and Pennsylvania, and the Ohio River, formed the division between slave States and free. Missouri lies beyond the Mississippi River, and out of the limits fixed, and the question was a threatening one until Henry Clay brought in his famous **Missouri Compromise**, which admitted Missouri as a slave State, and forbade slavery north of 36° 30' north latitude. To balance Missouri in the Senate, Maine was admitted at the same time as a free State.

A protective tariff had been devised by John C. Calhoun in 1816, and President Monroe strengthened and increased the protection accorded. In 1819 he purchased Florida from Spain; and in 1823, in consequence of the war made by Spain against her revolted colonies in the three Americas, he voiced that splendid declaration which will always be associated with his name—the **Monroe Doctrine**. This doctrine briefly is that the United States will not interfere in any European war, nor will it permit European interference or European control in America North or South.

No better proof could be given of the condition of parties than the election which ended Monroe's tenure of office. The electoral college chose a vice-president, John C. Calhoun, but its vote for the presidency was so scattered between Jackson, Adams, Crawford and Clay that the choice was thrown into the House. Here, by an alliance of the friends of Clay and Adams, Jackson was defeated and **JOHN QUINCY ADAMS** (1825-1829) became the sixth president. Clay was rewarded with the portfolio of State, and out of the alliance the "**Whig**" Party was formed. Their principles were in part those of the old Federalists. They were for a high tariff with strong protection, and they early declared for a policy of internal improvements to be paid for by the nation at large. Jackson's followers took the place of the old anti-Federalists; they were strict constructionists, opposed to the tariff, and in their principles and speeches was to be found the nucleus of the States' rights doctrine. They called themselves "**Democrats**." The four years of Adams' presidency was passed in marshaling and organizing the two opposing forces.

**ANDREW JACKSON** (1829-1837), the seventh president, carried everything before him. The electoral vote was 178 to 83;





**WYOMING**, in 1880, ranked twelfth among the States and Territories in cattle, fourteenth in gold, sixteenth in coal, thirty-fourth in miles of railway, forty-sixth in population. First settlement, by Americans, in 1867. Organized as a territory in 1868. Admitted to the Union 1890.



the popular, 647,231 for Jackson, 509,097 for Adams. As soon as he had taken up the reigns of power, Jackson removed some five hundred office-holders from their places, on Marcy's famous theory that "to the victors belong the spoils." Upon this principle the tenure of political office still practically, if not theoretically, depends.

The Tariff was exceedingly unpopular at the South, which was then as now, an agricultural rather than a manufacturing region. Several States had protested, and in 1830 Senator Hayne laid down the doctrine of Nullification—that any State could declare null and void any act of Congress. Webster answered this declaration in the debate which has since been famous. The original discussion was not on the tariff regulations, but on the sale of public lands. The struggle was a hot one. Jackson took occasion to put himself on record at once with his celebrated toast, "Our Federal Union, it *must* be preserved." The words were first uttered at a dinner in honor of his birthday. Calhoun took the opposite view, and in 1831 the president's cabinet was broken up by the issue. A new tariff bill was passed, but the South was still dissatisfied, and in 1832 South Carolina passed the Nullification ordinance. Jackson at once sent a naval force into Charleston harbor, and Congress passed a bill enforcing the tariff; but Henry Clay again came forward with a compromise which was accepted on both sides.

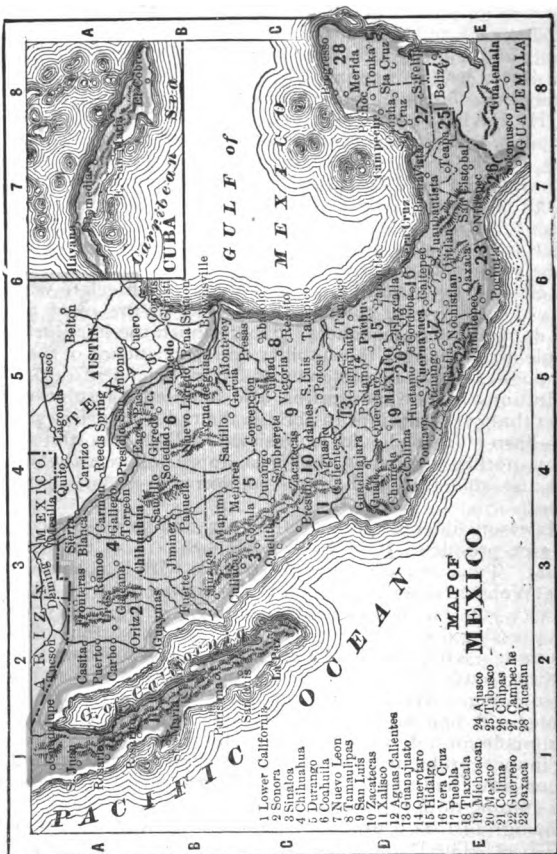
The United States Bank was the next bone of contention. It had been chartered in 1816 for twenty years. After a struggle with Congress, and with his secretary of the Treasury, Duane, who would not remove the national deposits from the bank, Jackson dismissed Duane and appointed Taney secretary of the Treasury. The deposits ceased. The Senate at once passed a vote of censure on the president, but the House, after investigating the bank, sustained Jackson at every point and refused a new charter. The fight with the Senate, in which there was an adverse majority, continued until the end of Jackson's term. During his administration was the first weak beginning of the Abolition party. The Anti-Slavery Society was formed in 1833. It was the target for abuse and violence, which culminated in the assassination of Lovejoy. Congress solemnly declared that it would listen to no petitions upon the question of slavery, and Jackson asked that the sending of abolition documents through the mails should be prohibited. This the Senate refused.

The Democratic candidate, **MARTIN VAN BUREN** (1837-1841), the eighth president, was elected over W. H. Harrison and several other opposition nominees, including Daniel Webster. He followed out Jackson's policy to the letter, one part of which, the celebrated "specie circular," brought on the **Great Panic of 1837**.

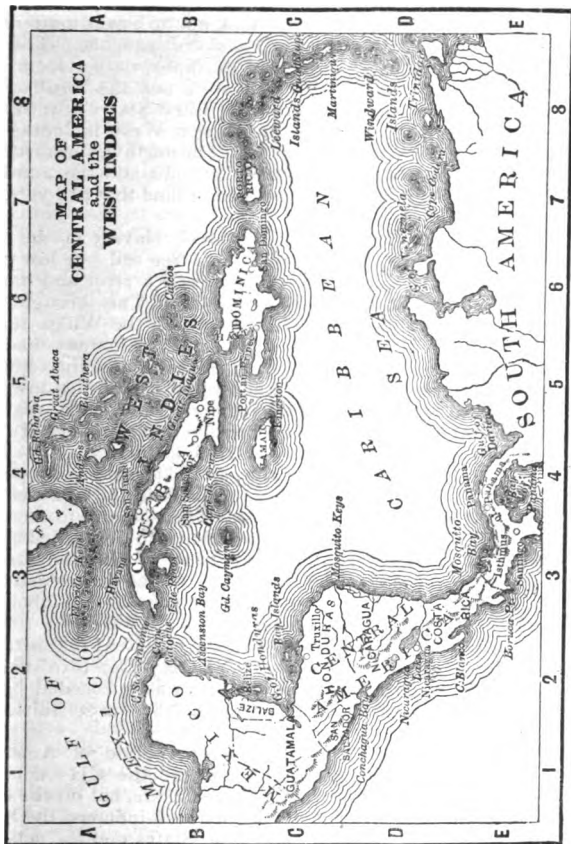
This was an order to United States agents to receive only gold and silver for public lands. Banks collapsed, money became scarce, and failures were most frightfully numerous. In 1840 Van Buren was renominated, but the Whigs, by an attack on the Democratic financial policy, carried the country and elected **W. H. HARRISON** (1841) the ninth president. It was in this campaign that the abolitionists produced their first national platform, which favored the abolition of slavery in the District of Columbia and the Territories. In the same year the Democracy at Baltimore resolved that Congress had no power to interfere with or control the domestic institutions of the several States, which were the sole and proper judges of everything pertaining to their own affairs not prohibited by the Constitution, and that the efforts "by Abolitionists or others" to interfere with questions of slavery were calculated "to lead to the most alarming and dangerous consequences," "to diminish the happiness of the people and endanger the stability and permanence of the Union, and ought not to be countenanced by any friend of our political institutions." The convention also adopted a resolution to the effect that every attempt to abridge the rights or privileges of foreign born citizens should be resisted. This was aimed at the Know-nothing tendency then just appearing, which had, however, no affiliation with the Abolition movement, already vigorous.

Harrison did not live out the year, and he was succeeded by the vice-president, **JOHN TYLER** (1841-1845), the tenth president. Tyler rapidly got into trouble with his cabinet, which, save Webster, deserted him on issues connected with his attempt to carry out Harrison's financial policy. The slavery question was pressing forward more and more urgently for solution all this time. An Ohio Congressman, Giddings, brought the issue into the House of Representatives, and was censured by that body for so doing. He resigned and was at once unanimously re-elected. A new tariff bill was brought in, and the proposition then made for a division of the surplus among the States.

Finance, protection, internal improvements, and indeed every minor issue, had to give way to the great puzzle of slavery. It was coming on for adjustment, and no hand could stay it. In the campaign of 1844 it produced the dispute over the re-annexation of Texas. The Democratic platform declared the **Great American Measures**—the taking in of Texas and Oregon. As Texas would be a slave territory, the idea was antagonized in the North, but after a close and perplexed election **JAMES K. POLK** (1845-1849), the eleventh president, was elected. Henry Clay, the Whig candidate, was beaten by the vote of 62,300 which was given to Jas. G. Birney by the Liberty party.



The Republic of Mexico comprises 27 States, a federal district and the territory of Lower California. The principal industries are agriculture, mining and stock raising. Climate mild and healthful in the elevated interior, but hot and pestilential along the coast. The Mexicans are a very mixed race, about one-tenth being Creoles, descendants of Spanish colonists.



**Central America and West Indies.**—Central America consists of five independent republics and the British colony Balize. Principal products, coffee, sugar and dyewoods. In the elevated interior, gold, silver and coal abound. Sugar, tobacco and cigars, coffee and fruits are the principal products of Cuba. Two independent negro republics, Hayti and San Domingo, constitute the island of Hayti.

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The new administration at once took up the Texas matter, and the War with Mexico was the necessary consequence. The history of that struggle will be found in its appropriate place in this book. It is here necessary merely to point out the results. By the treaty of Guadalupe-Hidalgo, the United States acquired all that country which we now call the great West, including the treasures of California and the Sierras. The northwestern frontier was fixed at the 49th degree of north latitude, and the administration closed with the largest accession of land that had yet been made to the Republic.

The Wilmot Proviso attempted to block slavery in the new territories, and Oregon was organized as free soil. A low tariff bill was passed, and the Whigs got through a river and harbor bill which the president promptly vetoed. This brought the country up to the campaign of 1848, in which the Whigs recovered the government. The platform of the Democracy made at Baltimore approved the Mexican war, congratulated the republic of France on achieving its liberty, and the world on the downfall of thrones and dominations everywhere. The same year, at Philadelphia, the Whigs resolved merely that Zachary Taylor was the best man for president. At Buffalo, in the same year, the Abolitionists determined that they would forget all past political differences in a common resolve to maintain the rights of free labor against the aggression of the slave power, and to secure a free soil to a free people. This convention also demanded cheap postage; river and harbor improvements when required for the general convenience; indorsed the idea of the homestead law; and inscribed on its banner "free soil, free speech, free labor and free men."

The magic of military success and the excellent organization of the Whigs made **ZACHARY TAYLOR** (1849-1850) twelfth president. He lived but a short time and was succeeded by the vice-president, **MILLARD FILLMORE** (1850-1853), thirteenth president.

With 1850 what might be called the war period of American politics began. In this year was introduced the Clay compromise, which admitted California as a free State, but on the other hand altered the **Fugitive Slave Laws**, which inflamed the North to the point of war. Several of the States met the action of Congress by personal liberty laws, which really amounted to nullification. The old parties broke up; there were Democrats, and Free Soil Democrats, and Whigs. Winfield Scott, the Whig candidate, carried only four States in the Union, and **FRANKLIN PIERCE** (1853-1857), the fourteenth president, was elected.

There was soon actual fighting, on the dividing line between North and South. The **Kansas-Nebraska Bill** repealed the Mis-

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souri compromise and made all new territory open to slavery. The Whig party split in two on this issue, one of the sections becoming the Republican party of the day, the other going over finally to the Democrats, a fact which will account for much of the confusion on purely financial and tariff issues to be found in both those parties to-day. When you find a Republican who is a free trader, or a Democrat who is a protectionist, the anomaly is to be traced directly to the fissure, and the new sides taken in the 1850's on the free soil question.

Passions were at fever heat. In Kansas the "Jayhawkers" and the "Border Ruffians" were already at each other's throats. It was plain that the matter in dispute could only be settled by an appeal to the arbitrament of arms.

In 1856 the Republicans nominated their first candidate, Gen. John C. Fremont, "the Pathfinder." Their platform recites that the convention was called without regard to previous political differences, to enable all opposed to the repeal of the Missouri compromise to come together. The platform opposed the extension of slavery into the territories; declared that Congress should prohibit in the territories "the twin relics of barbarism, polygamy and slavery;" and opposed all prescriptive legislation, thus antagonizing the Democracy on the slavery issue and the Know-nothings on nativism. The Whigs met at Baltimore. Their platform is devoted exclusively to a denunciation of "geographical parties," and a recommendation of Millard Fillmore, the American or "Know-nothing" candidate for President. The Democrats added little to former platforms, save that they declared against the Know-nothings on their war on foreigners, and agreed with them in their declaration against intervention with slavery. They nominated and elected **JAMES BUCHANAN** (1857-1861), fifteenth president. Fremont, however, polled a popular vote of 1,341,264 against Buchanan's 1,838,169, while Fillmore received 874,534.

The **Dred Scott Case** now came on to exacerbate still more bitterly public feeling. Chief Justice Taney declared that a negro was a chattel, that the compromise of 1820 was unconstitutional, and that a slave-owner might settle with his property where he pleased, in any territory. Following this came John Brown's raid into Virginia—his attempt to excite a slave insurrection, and his death upon the gallows. There was nothing for it but war, and into war the country rapidly drifted.

The campaign of 1860 was the most confused in the whole history of American politics. There was talk of secession in the air. There was notoriously war preparation in the South. The North was divided. Every man felt that parties would have to be re-arranged and new political frontiers defined. The

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"Constitutional Union" party met at Baltimore. All it demanded was the "Constitution of the country, the union of the States, and the enforcement of the laws." The Republicans met at Chicago. The platform is the most significant in the political history of the republic, and contains the essence of all its history since that date. It denounced the threats of disunion made by Democrats in Congress as an "avowal of contemplated treason" which it was the duty of the people to "rebuke and forever silence." It asserted that the normal condition of all the territory of the United States is that of freedom; that the reopening of the slave trade was a crime against humanity; that duties should be adjusted so as to encourage the development of the industrial interests of the whole country; that Congress should pass a complete and satisfactory homestead law; that the rights of citizenship enjoyed by foreigners should not be abridged or impaired; that the rights of all citizens, native or naturalized, should be protected abroad and at home. The Douglas Democratic platform, adopted at Charleston, favored the acquisition of Cuba; declared that State legislatures which interfered with the enforcement of the fugitive slave law were revolutionary and subversive of the Constitution; and reaffirmed the Cincinnati platform of 1856 on tariff. The Breckinridge platform, adopted at Charleston and Baltimore, reaffirmed the Democratic platform adopted at Cincinnati, with certain "explanatory resolutions," which in substance were that slave-owners had a right "to settle with their property" in the territories without being interfered with by territorial or congressional legislation.

On these issues four candidates were put in the field. The Republicans nominated Abraham Lincoln; the Democrats, J. C. Breckinridge; the Constitutional Union party, John Bell; the Independent Democrats, Stephen A. Douglas. **ABRAHAM LINCOLN** (1861-1865) was chosen sixteenth president, by a popular vote of 1,866,352; Douglas received 1,375,157; Breckinridge, 845,763; Bell, 589,581.

On December 20, 1860, South Carolina declared that the Union was dissolved, and a Secession resolution was passed. Following, six other slave States immediately seceded. Every effort was made to stem the tide of disunion, but nothing could be done save with arms in the field. A peace congress met and proved futile. The Crittenden compromise was scoffed out of court. The Confederate States of America was formed at Montgomery, Alabama, in February, 1861, with Jefferson Davis as president, and slavery and low tariffs as its corner stone. The first ball was fired April 14, 1861, and the great issue of the century joined.

For the time politics were relegated to the background.

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There were only Unionists and Secessionists. The financing of the great struggle led to a high tariff, the issue of treasury notes, and finally the establishment of the national banking system. The internal revenue system was developed, an income tax was imposed, greenbacks were issued, and the resources of the country marshaled to meet the expenses of a war that cost \$1,000,000 a day.

On Jan. 1, 1863, President Lincoln issued the **Emancipation Proclamation**, which freed the Southern slaves, and marks an epoch in the history of the world. Two years later, under the apple tree at Appomattox, Lee surrendered to Grant, and the war ended with the complete triumph of the Northern arms. There had in the meantime been another presidential election, in which Lincoln defeated George B. McClellan and John C. Fremont. Shortly after Lee's surrender Lincoln was assassinated by J. Wilkes Booth, an actor, and **ANDREW JOHNSON** (1865-1869), the seventeenth president, took up the chief magistracy.

The problem of the day was the **Reconstruction** of the old slave States, upon which the new president and his party at once quarreled. The point at issue was the proper safe-guarding of the newly-freed negro. Congress passed the Civil Rights bill, the Freedman's Bureau bill, and submitted the XIVth Amendment to the Constitution. The president was finally impeached by Congress, but his trial before the Senate resulted in an acquittal by one vote.

**ULYSSES S. GRANT** (1869-1877), the eighteenth president, was elected over Horatio Seymour, on a platform adopted by the Republicans at Chicago, which denounced repudiation; favored suffrage on equal terms to all men; encouraged immigration and declared itself in sympathy with all oppressed people who are struggling for their rights. The Democratic platform of 1868 acknowledged that the questions of slavery and secession had been forever settled by the war or by constitutional conventions; and favored amnesty for all political offenses. It made a very distinct pronouncement on tariff in the following words: "A tariff for revenue upon foreign imports, and such equal taxation under the internal revenue laws as will afford incidental protection to domestic manufactures, and as will, without impairing the revenue, impose the least burden upon, and best promote and encourage, the great industrial interests of the country."

The XVth Amendment, guaranteeing negro suffrage, was passed by Congress in 1869. A Liberal Republican ticket, with Horace Greeley at its head, was supported by the united opposition against Grant in 1872, but was defeated easily, and Greeley, one of the greatest figures in later American politics, died shortly



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afterwards. The South was pacified, and the **Treaty of Washington** made, which involved the payment of the Alabama claims by the English Government.

In 1876 occurred the famous **Hayes and Tilden Controversy**, which tested the flexibility of our electoral machinery so severely. Tilden was the Democratic nominee, and he had an undoubted popular majority—4,284,265, against 4,033,295 for Hayes. Rival electors claimed to have been elected in Louisiana and Florida. Intimidation, fraud and illegal voting were charged, and Congress finally appointed the **Electoral Commission** to settle the dispute, as there was nothing in the Constitution to cover the circumstances. On a party vote the commission awarded the disputed electoral votes to the Republican candidate, thus making **RUTHERFORD B. HAYES** (1877–1881) nineteenth president of the United States. Specie payment was resumed during this administration, and the silver coinage act passed.

From this time on to the present the tariff issue has been the chief matter of debate in each campaign. In 1880 the Republicans elected **JAMES A. GARFIELD** (1881) twentieth president. He was assassinated by a madman, Charles J. Guiteau, and **CHESTER A. ARTHUR** (1881–1885) became twenty-first president. The most important measure of this administration was the passage of the Pendleton civil service reform bill.

**GROVER CLEVELAND** (1885–1889), the twenty-second president, was the first Democrat chosen since the war. Out of his famous tariff reform message the Democratic platform of 1888 was stated at St. Louis, and the country was invited to choose squarely between protection as represented by Benjamin Harrison, the Republican candidate, and a tariff revision as represented by Cleveland.

The result was, after one of the most remarkable struggles in American politics, already known by its well earned name of the **Campaign of Intellect**, that **BENJAMIN HARRISON** (1889— . . . ) was elected twenty-third president of the United States.

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**THE BY-WAYS OF AMERICAN POLITICS.** The minor American parties which have appeared and disappeared during our century and over of national life are the following: **Anti-Renters**, a New York party which flourished about 1841. They resisted the collection of back rents on the Van Rensselaer manor near Albany. They had strength enough to defeat Wright, the regular Democratic candidate for Governor of New York. **Barn-burners**, New York, 1846, seceders from the Democratic party. They were opposed to slavery extension. **Bucktails**, New York, about 1815; they supported Madison. **Conservatives**, New York and some other States, 1837; paper money Democrats. **Doughfaces**, 1820, Northern members of Congress who voted in favor of the Missouri compromise. **Hunkers**, New York, a faction of the Democrats favoring the South, Barn-burners being the other factor. **Know-Nothings**, New York, 1854, opposed to naturalization of foreigners unless they had been twenty-one years in the country.

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**Loco-Focos**, New York, 1835; a branch of the Democratic party. **Liberal Republicans**, 1872; Republicans who joined with the Democrats in support of Greeley for president. **Temperance**, or Prohibition, from 1830 down, in many States; in favor of preventing or restricting the sale of liquors. The total Prohibition vote at the Presidential election in 1888 was 249,937. **Woman's Rights**, from 1860 down; those who favored granting to women the right of suffrage.

### PRESIDENTS OF THE UNITED STATES.

NAME.	NATIVE STATE.	ANCESTRY.	RESIDENCE.	INAUGURATED.		POLITICS.	PLACE OF DEATH.
				YEAR.	AGE.		
George Washington.	Va...	English...	Va...	1789	57	Fed.	Mount Vernon, 17. 9
John Adams.....	Mass.	English...	Mass.	1797	62	Fed..	Quincy, Mass., 1826
Thomas Jefferson...	Va...	Welsh...	Va...	1801	58	Rep..	Monticello, Va. 1826
James Madison.....	Va...	English...	Va...	1809	53	Rep..	Montpelier, Va. 1836
James Monroe.....	Va...	Scotch...	Va...	1817	59	Rep..	New York City, 1731
John Quincy Adams.	Mass.	English...	Mass.	1825	58	Rep..	Washington, 1848
Andrew Jackson....	S. C.	Scot-Irish.	Tenn	1829	62	Dem..	Hermitage, Ten. '45
Martin Van Buren...	N. Y.	Dutch....	N. Y.	1837	55	Dem..	Kinderhook NY, '62
William H. Harrison	Va...	English...	Ohio..	1841	58	Whig.	Washington, 1841
John Tyler.....	Va...	English...	Va...	1841	51	Dem..	Richmond, Va, 1862
James K. Polk....	N. C.	Scot-Irish.	Tenn.	1845	60	Dem..	Nashville, Ten, 1849
Zachary Taylor....	Va...	English...	La...	1849	55	Whig.	Washington, 1850
Millard Fillmore...	N. Y.	English...	N. Y.	1850	50	Whig	Buffalo, N. Y., 187
Franklin Pierce....	N. H.	English...	N. H.	1853	49	Dem..	Concord, N. H., 1869
James Buchanan....	Pa...	Scot-Irish	Pa...	1857	60	Dem..	Wheatland, Pa, 1868
Abraham Lincoln...	Ky...	English...	Ill...	1861	52	Rep..	Washington, 1865
Andrew Johnson....	N. C.	English...	Tenn.	1865	57	Rep..	Greenville, Ten, '75
Ulysses S. Grant...	Ohio.	Scotch...	Ill...	1869	47	Rep..	MtM'Gregor NY '85
Rutherford B. Hayes	Ohio..	English...	Ohio..	1877	55	Rep..	.....
James A. Garfield...	Ohio..	English...	Ohio..	1881	49	Rep..	Long Branch, 1881
Chester A. Arthur...	Vt....	Scot-Irish	N. Y.	1881	51	Rep..	New York City, 1886
Grover Cleveland...	N. J.	English...	N. Y.	1885	48	Dem..	.....
Benjamin Harrison.	Ohio..	English...	Ind...	1889	56	Rep..	.....

### GENERALS COMMANDING THE U. S. ARMY.

	FROM	TO		FROM	TO
George Washington.	1775	1783	Alexander Macomb	1828	1841
Henry Knox.....	1783	1784	Winfield Scott.....	1841	1861
Josiah Harmer....	1788	1791	George B. McClellan	1861	1862
Arthur St. Clair...	1791	1796	Henry W. Halleck.	1862	1864
James Wilkinson...	1796	1798	Ulysses S. Grant.	1864	1869
George Washington.	1799	1799	William T. Sherman	1869	1883
James Wilkinson...	1800	1812	Philip H. Sheridan	1883	1888
Henry Dearborn...	1812	1815	John M. Schofield..	1888	
Jacob Brown	1815	1828			

IF A RAILWAY were built to the sun, and trains upon it were run at the rate of 30 miles an hour, day and night, without a stop, it would require 350 years to make the journey from the earth to the sun.

## WARS OF THE UNITED STATES.

### Statement of the Number of United States Troops Engaged.

WARS.	FROM—	TO—	REGU- LARS.	MILITIA AND VOLUN- TEERS.	TOTAL.
War of the Revolution...	Apr 19, 1775	Apr 11, 1783	130,711	164,080	309,791
Northwestern Indian wars	Sept 19, 1790	Aug 3, 1791	.....	.....	8,943
War with France.....	July 9, 1798	Sept 30, 1800	.....	.....	*4,593
War with Tripoli.....	June 10, 1801	June 4, 1805	.....	.....	*3,330
Creek Indian war.....	July 27, 1813	Aug 9, 1814	600	13,181	13,781
War 1812 with Gt Britain	June 18, 1812	Feb 17, 1815	85,000	471,622	576,622
Seminole Indian war.....	Nov 20, 1817	Oct 21, 1818	1,000	6,911	7,911
Black Hawk Indian war.	Apr 21, 1831	Sept 31, 1832	1,339	5,126	6,465
Cherokee disturbance or removal.....	1836	1837	.....	9,494	9,494
Creek Indian war or dis- turbance.....	May 5, 1836	Sept 30, 1837	935	12,483	13,418
Florida Indian war.....	Dec 23, 1835	Aug 14, 1843	11,169	29,953	41,122
Aroostook disturbance.....	1838	1839	.....	1,500	1,500
War with Mexico.....	Apr 24, 1846	July 4, 1848	30,954	73,776	112,230
Apache, Navajo, and Utah war.....	1849	1855	1,500	1,061	2,561
Seminole Indian war.....	1856	1858	.....	3,687	2,687
Civil war.....	1861	1865	.....	.....	2,772,408

\* Naval forces engaged. † The number of troops on the Confederate side was about 600,000.

The number of casualties in the volunteer and regular armies of the United States, during the war of 1861-65, was reported by the Provost Marshal General in 1866: Killed in battle, 61,362; died of wounds, 34,727; died of disease, 183,287; total died, 279,376; total deserted, 199,105. Number of soldiers in the Confederate service who died of wounds or disease (partial statement), 133,821. Deserted (partial statement), 104,428. Number of United States troops captured during the war, 212,608; Confederate troops captured, 476,169. Number of United States troops paroled on the field, 16,431; Confederate troops paroled on the field, 248,599. Number of United States troops who died while prisoners, 29,725; Confederate troops who died while prisoners, 26,774.

### The Bible.

There is no date from beginning to end in the Bible. It comprises some 60 documents, and is supposed to have been written by about 40 men; 54 miracles are recorded in the Old and 51 in the New Testament; total, 105. The shortest verse in the Old Testament is "Remember Lot's wife." There is one in the New Testament as short as John xi. 35, in point of words, but not in letters, viz: Thessalonians v. 16, "Rejoice evermore." Then there are 2 chapters in the Bible alike verbatim, and 1 book, Esther, in which the Deity is not mentioned.

# THE CIVIL WAR OF 1861-65.

## Number of Men in the Union Army Furnished by Each State and Territory, from April 15, 1861, to Close of War.

STATES AND TERRITORIES.	NUMBER OF MEN FURNISH'D	AGGREGATE REDUCED TO A THREE YEARS' STANDING.	STATES AND TERRITORIES.	NUMBER OF MEN FURNISH'D	AGGREGATE REDUCED TO A THREE YEARS' STANDING.
Alabama.....	2,556	1,611	New York.....	448,850	392,270
Arkansas.....	8,229	7,836	North Carolina..	3,156	3,156
California.....	15,725	15,725	Ohio.....	313,180	240,514
Colorado.....	4,903	3,697	Oregon.....	1,810	1,773
Connecticut.....	55,964	50,623	Pennsylvania....	337,936	265,517
Delaware.....	12,284	10,322	Rhode Island....	23,236	17,866
Florida.....	1,290	1,290	South Carolina..	.....	.....
Georgia.....	.....	.....	Tennessee.....	31,092	26,394
Illinois.....	259,092	214,133	Texas.....	1,965	1,632
Indiana.....	196,363	153,576	Vermont.....	33,288	29,068
Iowa.....	76,242	68,630	Virginia.....	.....	.....
Kansas.....	20,149	18,766	West Virginia....	32,668	27,714
Kentucky.....	75,760	70,832	Wisconsin.....	91,327	79,260
Louisiana.....	6,224	4,654	Dakota.....	206	206
Maine.....	70,107	56,776	Dist of Columbia	16,534	11,506
Maryland.....	46,638	41,275	Indian Territory	3,530	3,530
Massachusetts..	146,730	124,104	Montana.....	.....	.....
Michigan.....	87,364	80,111	New Mexico.....	6,561	4,432
Minnesota.....	24,020	19,693	Utah.....	.....	.....
Mississippi.....	545	545	Washington Ter.	964	964
Missouri.....	109,111	86,530	U S Army.....	.....	.....
Nebraska.....	3,157	2,175	U S Volunteers..	.....	.....
Nevada.....	1,080	1,080	U S col'd troops	93,441	91,789
New Hampshire..	33,937	30,819			
New Jersey.....	76,814	57,908	Total.....	2,772,405	2,320,272

The armies of the United States were commanded during the war of the Rebellion by President Lincoln as commander-in-chief under the constitutional provision; and under him, as general commanders, by Brevet Lieutenant General Winfield Scott until Nov. 6, 1861; by Major General George B. McClellan from Nov. 6, 1861, to March 11, 1862; by Major General Henry W. Halleck from July 11, 1862, to March 12, 1864 (there being no general commander between March 11 and July 11, 1862); and Lieutenant General and General U. S. Grant from March 12, 1864, to March 4, 1869. The first of the principal armies into which the force of the United States was divided was the Army of the Potomac. This army was called into existence in July, 1861, and was organized by Major General George B. McClellan, its first commander; Nov. 5, 1862, Major General A. E. Burnside took command of it; Jan. 25, 1863, Major General Joe Hooker was placed in command, and June 27, 1863, Major General George G. Meade succeeded him. The Army of the Ohio was organized by General D. C. Buell, under a general order from the

## THE CIVIL WAR OF 1861-65.

War Department dated Nov. 9, 1861, from troops in the military department of the Ohio. General Buell remained in command until Oct. 30, 1862, when he was succeeded by General W. S. Rosecrans. At this time the Army of the Ohio became the Army of the Cumberland and a new department of the Ohio was formed and Major General H. G. Wright assigned to the command thereof. He was succeeded by Major General Burnside, who was relieved by Major General J. G. Foster of the command of both department and army. Major General Schofield took command Jan. 28, 1864, and Jan. 17, 1865, the department was merged into the Department of the Cumberland. The Army of the Cumberland was formed of the Army of the Ohio, as above noted. It continued under the command of General Rosecrans until October, 1863, when General George H. Thomas took command of it. The Army of the Tennessee was originally the Army of the District of Western Tennessee, fighting as such at Shiloh. It became the Army of the Tennessee on the concentration of troops at Pittsburgh Landing under General Halleck, and when the Department of the Tennessee was formed, Oct. 16, 1862, the troops serving therein were placed under command of Major General U. S. Grant. Oct. 27, 1863, Major General William T. Sherman was appointed to the command of this army; March 12, 1864, Major General J. B. McPherson succeeded him; July 30, 1864, McPherson having been killed, Major General O. O. Howard was placed in command, and May 19, 1862, Major General John A. Logan succeeded him. Other minor armies were the Army of Virginia, which was formed by the consolidation of the forces under Major Generals Fremont, Banks and McDowell, by order of the War Department, Aug. 12, 1862. Major General John Pope was placed in command, but after the disastrous defeat of this general at Manassas the army as such was discontinued and its troops transferred to other organizations. The Army of the James was formed of the Tenth and Fourteenth corps and cavalry, and was placed under the command of Major General Butler. Its operations were carried on in conjunction with the Army of the Potomac. Other temporary arrangements of the troops formed the Army of the Mississippi in the Mississippi River operations in 1862; the Army of the Gulf in Louisiana in May, 1863; the Army of West Virginia, in the valley of the Shenandoah, in May, 1864, and the army of the Middle Military Division in Virginia in the fall of 1864.

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A HORSE will live 25 days without solid food, merely drinking water; 17 days without either eating or drinking; and only 5 days when eating solid food without drinking.

# PRINCIPAL BATTLES OF THE CIVIL WAR.

DATE.	PLACE.	FEDERAL LOSS.	CONFED. LOSS.
Apr. 12, 1861	Bombard'nt Ft. Sumter.	no one hurt	5 w
19	Riot Baltimore	3 k, 7 w	7 k, 8 w
June 20	Big Bethel, Va.	16 k, 34 w, 6 m	no report
July 5	Carthage, Mo.	13 k, 31 w	250 k & w
12	Rich Mountain, W. Va.	11 k, 35 w	140 k, 150 w
" 21	Bull Run, Va.	4500 k; w, p, 28 c	1852 k & w
Aug. 10	Wilson's Creek, Mo.	481 k, 1011 w, 700 p	421 k, 1317 w, 3 m
Sept. 12-14	Cheat Mountain, W. Va.	223 k, 721 w, 292 m	100 k & w, 20 p
" 20	Lexington, Mo.	13 k, 20 w, 60 p	25 k, 75 w
" 21	Ball's Bluff, Va.	42 k, 108 w, 1624 p	36 k, 264 w, 2 p
Nov. 7	Belmont, Mo.	220 k, 266 w, 500 p	261 k, 427 w, 278 m
" 7	Port Royal, S. C.	84 k, 288 w, 28 m	k and w no report
" 8	Piketon, Ky.	8 k, 23 w, 250 p	2500 p, 42 guns c
Dec. 18	Milford, Mo.	6 k, 24 w	400 k and w, 2000 p
Jan. 19, 1862	Mill Spring, Ky.	2 k, 17 w	1300 p
Feb. 8	Roanoke Island, N. C.	39 k, 207 w	192 k, 140 p
" 8	Fort Henry, Tenn.	50 k, 100 w	30 k, 50 w, 2500 p
" 16	Fort Donelson, Tenn.	446 k, 1735 w, 150 p	231 k, 1007 w, 15000 p
Mar. 8	Pea Ridge, Ark.	1351 k, w and m	1100 k, 2500 w, 1600 p
" 14	Newbern, N. C.	91 k, 466 w	50 k, 200 w, 200 p
" 23	Winchester, Va.	100 k, 400 w	600 k & w, 300 p
Apr. 6-7	Pittsburg Landing, Tenn.	1614 k, 7721 w, 3963 m	1728 k, 8012 w, 959 m
" 10	Island No. 10.	17 k, 6300 p	17 k, 6300 p
May 5	Williamsburg, Va.	2073 k & w, 623 p	700 k, 1000 w, 300 p
" 25	Winchester, Va.	53 k, 526 m	500 k & w, 600 p
" 29	Hanover C. H., Va.		
" 30	Corinth, Minn.		
" 31	Fair Oaks, Va.	890 k, 3627 w, 1222 p	2800 k, 3897 w
June 1	Fair Oaks, Va.	5739 k & w	8000 k & w
" 8	Cross Keys, Va.	125 k, 500 w	600 k & w
" 9	Port Republic, Va.	67 k, 361 w, 574 m	1000 k, w & m
" 26	Chickahominy, Va.	80 k, 150 w	1000 k & w
" 27	Gaines Mills, Va.	7500 k, w and m	About the same
July 1	Malvern Hill, Va.	1000 k, w and m	Nearly 5000
Aug. 5	Baton Rouge, La.	250 k, w and m	600 k, w & m
" 9	Gedar Mountain, Va.	1500 k, w and m	1000 k, 1500 w
" 22	Gallatin, Tenn.	64 k, 100 w, 200 p	110 k & w
" 27	Kettle Run, Va.	800 k, w and m	800 k & w, 1000 p
" 29	Groveton, Va.	6000 k, w and w	12000 k, w & m
" 30	Bull Run and	800 k, 4000 w, 3000 p	700 k, 3000 w
" 29-30	Richmond, Ky.	200 k, 700 w, 2000 p	250 k, 500 w
Sept. 1	Chantilly, Va.	1300 k and w	800 k & w
" 14	South mountain, Md.	443 k, 1806 w, 76 m	500 k, 2343 w, 1500 p
" 15	Harper's F'y, 3 d'ys' siege	80 k, 120 w, 11583 p	1500 k & w
" 17	Antietam, Md.	12500 loss	15000 loss
" 19-20	Iuka, Miss.	135 k, 527 w	263 k, 400 w, 600 p
Oct. 3-5	Corinth, Miss.	315 k, 1812 w, 232 m	1423 k, 2268 p, 569 w
" 8	Perryville, Ky.	3200 k, w and m	1300 k, 3000 w, 200 p
Dec. 7	Prairie Grove, Ark.	495 k, 600 w	1500 k & w
" 13	Fredericksburg, Va.	1512 k, 6000 w, 2078 p	1800 k & w
" 27-29	Vicksburg	191 k, 982 w, 756 m	no report
Jan. 2, 1863	Stone River, Tenn.	1533 k, 6000 w	9000 k & w, 1000 p
" 11	Fort Hindman, Ark.	1000 k, w & m	550 k & w, 5000 p
Feb. 3	Fort Donelson, Tenn.	12 k, 20 w	100 k, 400 w, 300 p
May 1	Suffolk, Va.	130 k, 718 w, 5 m	1500 k, w & m

**PRINCIPAL BATTLES OF THE CIVIL WAR.—Continued.**

DATE.	PLACE.	FEDERAL LOSS.	CONFED. LOSS.
May 1	LaGrange, Ark.	2000 k, w & m	.....
" 2	Fredericksburg, Va.	2000 k & w	.....
" 2-3	Chancellorsville, Va.	15000 k & w, 17000 p	18000 k & w, 5000 p
" 12	Jackson, Miss.	40 k, 240 w, 6 m	400 k & w
" 14	Champion Hills, Miss.	426 k, 1842 w	400 k, w & m
" 16	Big Black River, Miss.	29 k, 242 w	2600 k, w & m
" 18-22	Vicksburg, Miss.	2500 loss	no report
" 27	Port Hudson	900 k, w & m	600 k, w & m
June 6	Milliken's Bend, Miss.	127 k, 287 w, 157 m	200 k, 500 w
" 9	Beverly Ford, Va.	380 k, w & m	750 k, w & m
" 14	Winchester, Va.	2000 k, w & m	850 k, w & m
" 26	Shelbyville, Tenn.	85 k, 468 w, 13 m	1634 p, no rep't k & w
July 1-2-3	Gettysburg, Pa.	total loss 28:98	total loss 37000
" 4	Vicksburg surrenders	245 k, 3688 w, 303 p	900 k & w, 30600 p
" 4	Helena, Ark.	250 k, w & m	500 k & w, 1000 p
" 5	Bolton, Miss.	.....	4000 p
" 8	Port Hudson surrenders	.....	5500 p
" 18-19	Ft. Wagner, S. C.	700 k, w & m	500 k, 331 w
Sept. 9	Cumberland Gap.	.....	2000 p
" 19-20	Chickamauga	1644 k, 9262 w, 4945 m	17000 k, w & m
" 14	Bristow Station, Va.	51 k, 329 w	1200 k & w, 800 p
Dec 4	Knoxville, Tenn.	600 k & w	1600 p
" 23-25	Chattanooga	4000 k & w	16000 k, w & m
" 25	Missionary Ridge	.....	.....
" 27	Ringgold, Ga.	800 k, w & m	300 p
" 27-30	Locust Grove, Va.	1000 k, w & m	2500 k, w & p
Mar 25, 1864	Paducah, Ky.	14 k, 46 w	1000 k & w
Apr. 8-9	Mansfield, La.	500 k & w, 1500 p	2000 p
" 17-20	Plymouth, N. C.	150 k, 1700 p	1500 k & w
May 5-7	Wilderness, Va.	loss 30000	loss 30000
" "	Spottsylvania, Va.	loss 10000	loss 10000
" 12	Spottsylvania, Va.	.....	4000 p
" 12-15	Ft. Darling, Va.	5000 k, w & m	no report
" 13-15	Resaca, Ga.	700 k, 2800 w	no report
" 25-28	Dallas, Ga.	1800 k & w	300 p, 4000 k & w
June 1	Cold Harbor, Va.	9000 k, w & m	8000 k, w & m
" 15-18	Petersburgh, Va.	loss 10000	no report
" 22	Weldon R. R., Va.	600 k & w, 1250 p	no report
" 27	Kennesaw Mt., Ga.	1000 k & w	no report
July 9	Monocacy, Md.	1000 k & w	no report
" 20	Peach Tree Creek, Ga.	1713 k, w & m	5000 k & w, 000 p
" 22	Atlanta, Ga.	3521 k & w	10000 k & w
" 27-30	Petersburgh, Va.	5000 k, w & m	1200 k, w & m
Aug. 5-20	Mobile Bay, Ala.	120 k, 88 w	no rep't k & w, 1756 p
" 15-18	Deep Bottom, Va.	loss 4000	loss 2500
" 19	6 Mile Station, Va.	3000 k & w	1500 p
" 25	Weldon R. R., Va.	1000 k & w, 3000 p	1500 k & w
" 31	Atlanta, Ga.	50 k, 50 m, 439 w	5000 k & w
Sept. 19	Winchester, Va.	3000 k & w	500 k, 4000 w, 2500 p
" 21	Fisher's Hill	600 k & w	400 k & w, 1100 p
" 26	Ironton, Mo.	9 k, 60 w	1500 k & w
29-Oct. 1	Petersburg, Va.	5000 k & w	2800 k & w
Oct. 19	Cedar Creek, Va.	4000 k & w, 1300 p	2800 k & w, 1300 p
" 26	Nims' Creek, Mo.	2000 p, 1000 k & w	900 k, 3800 p
" 27	Hatcher's Run, Va.	800 m, 400 k, 1500 w	1600 k, w & m
Nov. 30	Franklin, Tenn.	189 k, 1033 w, 1104 m	1750 k, 3800 w, 702 p
Dec. 15	Nashville, Tenn.	6500 k, w & m	23000 k, w & m

# **PRINCIPAL BATTLES OF THE CIVIL WAR.—*Concluded.***

DATE.	PLACE.	FEDERAL LOSS.	CONFED. LOSS.
Jan. 15, 1865	Ft. Fisher .....	110 k, 536 w	440 k & w, 2500 p
" 20-22	Wilmington, N. C. ....	250 k & w	1072 p
Feb. 27	Waynesboro', Va. ....	69 k & w	5 k, 1352 p
" "	Kingston, N. C. ....	loss 1000	1200 k & w, 2400 p
" "	Averasboro', N. C. ....	74 k, 774 w	327 k, 373 p
Mar. 19	Bentonville, N. C. ....	loss 1646	167 k, 1625 p
" 25-27	Petersburgh, Va. ....	180 k, 1240 w, 99 m	2200 k & w, 2800 p
Apr. 1	Five Forks, Va. ....	loss 3000	5000 p
" 2	Selma, Ala. ....		3000 p
" 2-3	Petersburgh & Richmond.	8600 k, w & m	9000 k, w & m
" 6	Farmville & Sailors Ck. ....		6000 p
" 9	Surrender of Gen. Lee. ....		26115 p
" 11	Ft. Blakely, Mobile ....	200 k & w	500 k & w, 4300 p
" 12	Surrender of Mong'y, Ala. ....		2700 p, 100 k
" 12	Salisbury, N. C. ....		1800 p
" 26	Surrender of Gen. Johnston		27500 p
May 1	Surrender of Gen. Morgan		1200 p
" 4	Surrender of Gen. Taylor.		10000 p
" 10	Surrender of Tallahassee Fl.	70 k	8000 p
" 10	Near Boco, Chico, Tex. ....	70	
" 10	Capture of Jeff. Davis ..		
" 26	Surrender of Gen. Smith.		20000 p

In addition to the battles given above there were 421 minor battles, engagements and skirmishes.

## **Principal Naval Battles of the Civil War.**

- 1862, Feb. 6—Fort Henry, Tenn., captured by Commodore Foote.
- Feb. 8—Roanoke Island, N. C., captured by Commodore Goldsborough and Gen. Burnside.
- 16—Fort Donelson, Tenn., combined forces of Gen Grant and Commodore Foote.
- Mar. 8—Confederate ram Merrimac "sinks" U. S. Frigates Cumberland and Congress, Hampton Roads, Va.
- 9—Federal Monitor disables the Merrimac.
- April 6—Pittsburgh Landing.
- 8—Capture of Island No. 10.
- 11—Fort Pulaski, Ga., captured by land and naval forces.
- 24—Forts Jackson, St. Phillip and New Orleans.
- May 13—Natchez, Miss., captured by Admiral Farragut.
- July 1—Malvern Hill.
- 1863, Jan. 11—Fort Hindman, Ark., Admiral Porter.
- 11—U. S. steamer Hatteras sunk by Confederate Alabama.
- 17—Monitor Weehawken captures Confederate ram Atlanta.



## THE CIVIL WAR OF 1861-63.

- May 18—Vicksburg, Miss., Admiral Porter.  
 July 8—Port Hudson, Miss., captured.  
     8—Natchez, Miss.  
 1864, June 19—U. S. steamer Kearsarge "sinks the Alabama" off  
     Cherbourg, France.  
 Aug. 5—Mobile, Ala., Admiral Farragut.  
 1865, Jan. 15—Fort Fisher, N. C., captured by Gen. Terry and  
     Commodore Porter.

During the Civil War the Federal Navy was increased in two years to over 400 vessels, the greater part of which were used in blockading Southern ports; notwithstanding their vigilance and effectiveness, many Confederate cruisers managed to escape the blockade and destroy the Northern merchant vessels.

At the present time (1880) not one-half the vessels belonging to the navy are in active service; the greater portion of those in commission are employed in what is called squadron service. There are seven squadrons, viz, the European, the Asiatic, the North Atlantic, the South Atlantic, the North Pacific, the South Pacific and the Gulf squadrons. These squadrons are under command of a high naval officer of the rank of commodore or rear admiral, whose ship is called the flag-ship of the squadron.

### Federal Vessels Captured or Destroyed by Confederate "Cruisers."

Ships .....	80	Steamboats.....	4
Brigs .....	46	Gunboats.....	2
Barks .....	84	Cutter .....	1
Schooners .....	67	Tug.....	1

### Vessels Captured or Destroyed for Violation of the Blockade, or in Battle, from May, 1861, to May, 1865.

Schooners.....	735	Gunboats.....	3
Sloops .....	155	Propellers .....	4
Steamers .....	262	Pilot boats.....	2
Barks.....	27	Boats .....	8
Brigs .....	30	Yachts.....	2
Ships.....	13	Tugs .....	3
Ironclads and rams ..	16	Barkentine.....	1
Brigantines.....	2	Pungy .....	1
Miscellaneous .....	86		

TIN, when compressed in powder, becomes solid under a pressure of ten tons on the square inch, zinc at thirty-eight tons, antimony at thirty-eight tons, aluminum at thirty-eight tons, bismuth at thirty-eight tons, and copper at thirty-three tons.

### Cost of Recent Wars.

Crimean war .....	£340,000,000
Italian war of 1859 .....	60,000,000
American civil war—North .....	940,000,000
“ “ “ —South .....	460,000,000
Schleswig-Holstein war .....	7,000,000
Austrian and Prussian war, 1866 .....	66,000,000
Expeditions to Mexico, Morocco, Paraguay, etc., (estimated) .....	40,000,000
Franco-Prussian war .....	500,000,000
Russian and Turkish war, 1877 .....	210,000,000
Zulu and Afghan wars, 1879 .....	30,000,000
	<hr/> £2,653,000,000

This would allow \$10 for every man, woman and child on the habitable globe. It would make two railways all around the world at \$250,000 per mile each. These figures are furnished by the Peace Society, London.

### Losses from War in Twenty-Five Years (1855-80.)

Killed in battle, or died  
of wounds and disease.

Crimean war .....	750,000
Italian war, 1859 .....	45,000
War of Schleswig-Holstein .....	3,000
American civil war—the North .....	280,000
“ “ “ —the South .....	200,000
War between Prussia, Austria and Italy, 1866 .....	45,000
Expeditions to Mexico, Cochin China, Morocco, Paraguay, etc .....	65,000
Franco-German war of 1870-71—France .....	155,000
“ “ “ “ —Germany .....	60,000
*Russian and Turkish war of 1877 .....	225,000
Zulu and Afghan wars, 1879 .....	40,000
Total .....	<hr/> 1,868,000

### Length and Cost of American Wars.

Wars.	Length.	Cost.
1. War of the revolution ...	7 years—1775-1782	\$ 135,193,703
2. Indian war in Ohio Ter	1790	.....
3. War with the Barbary St	1803-1804	.....
4. Tecumseh Indian war ..	1811	.....
5. War with Great Britain ..	3 years—1812-1815	107,159,003
6. Algerine war .....	1815	.....
7. First Seminole war .....	1817	.....
8. Black Hawk war .....	1832	.....
9. Second Seminole war ..	1845	.....
10. Mexican war .....	2 years—1846-1848	66,000,000
11. Mormon war .....	1856	.....
12. Civil war .....	4 years—1861-1865	\$6,500,000,000

\*About thirty thousand skeletons of Russian and Turkish soldiers were shipped to England in 1881, as manure, in the form of bones or bone dust. [177]

## GREAT BATTLES OF HISTORY.

The number placed *hors-de-combat* in battle are not relatively so large as formerly, as the table below will show:

	Men Engaged.	Hors-de-combat.	Ratio.
Thrasymene .....	65,000	17,000	27 per cent.
Cannæ .....	146,000	52,000	34 "
Bannockburn .....	135,000	38,000	28 "
Agincourt .....	62,000	11,400	18 "
Crecy .....	117,000	31,200	27 "
Marengo .....	58,000	13,000	22 "
Austerlitz .....	170,000	23,000	13 "
Borodino .....	250,000	78,000	31 "
Waterloo .....	145,000	51,000	35 "
Alma .....	103,000	8,400	8 "
Sadowa .....	402,000	33,000	8 "
Gravelotte .....	320,000	48,500	15 "
Gettysburg .....	140,000	8,000	5 "

According to Napoleon, the proportions of an army should be 70 per cent. infantry, 17 per cent. cavalry, and 13 per cent. between artillery, engineers and train.

The proportion of men capable of bearing arms is estimated at 25 per cent. of the population.

At the close of the Franco-German war the Germans took from the French 7,234 pieces of cannon, including 3,485 field pieces and 3,300 fortress guns. At the battle of Waterloo the British artillery fired 9,467 rounds, or one for every Frenchman killed.

### The Decisive Battles of History.

Actium, B.C. 31. The combined fleets of Antony and Cleopatra defeated by Octavius, and imperialism established in the person of Octavius.

Philippi, B.C. 42. Brutus and Cassius defeated by Octavius and Antony. The fate of the Republic decided.

Metaurus, B.C. 207. The Carthaginians, under Hasdrubal, were defeated by the Romans, under Caius and Marcus Livius.

Arbela, B.C. 331. The Persians defeated by the Macedonians and Greeks under Alexander the Great. End of the Persian empire.

Syracuse, B.C. 414. The Athenians defeated by the Syracusans and their allies, the Spartans, under Gylippus.

Marathon, B.C. 490. The Athenians, under Miltiades, defeated the Persians under Datis. Free government preserved.

Winfield-Lippe, A.D. 9. Teutonic independence established by the defeat of the Roman legions under Varus at the hands of the Germans under Arminius (Hermann).

Chalons, A.D. 451. The Huns, under Attila, called the

## *DECISIVE BATTLES OF HISTORY.*

"Scourge of God," defeated by the confederate armies of Romans and Visigoths.

Tours, A.D. 732. The Saracens defeated by Charles Martel and Christendom rescued from Islam.

Hastings, A.D. 1066. Harold, commanding the English army, defeated by William the Conqueror, and a new regime established in England by the Normans.

Siege of Orleans, A.D. 1429. The English defeated by the French under Joan of Arc.

Defeat of the Spanish Armada, A.D. 1588. England saved from Spanish invasion.

Lutzen, A.D. 1632. Decided the religious liberties of Germany. Gustavus Adolphus killed.

Blenheim, A.D. 1704. The French and Bavarians, under Marshal Tallard, defeated by the English and their allies, under Marlborough.

Pultowa, A.D. 1709. Charles XII., of Sweden, defeated by the Russians under Peter the Great.

Saratoga, A.D. 1777. Critical battle of the American War of Independence. The English defeated by the Americans under Gen. Gates.

Valmy, A.D. 1792. An invading army of Prussians, Austrians and Hessians, under the Duke of Brunswick, defeated by the French under Kellermann. The first success of the Republic against foreigners.

Trafalgar. On the 21st of October, A.D. 1805, the great naval battle of Trafalgar was fought. The English defeated the French and destroyed Napoleon's hopes to successfully invade England.

Waterloo, A.D. 1815. The French, under Napoleon, defeated by the allied armies of Russia, Austria, Prussia and England, under Wellington.

Siege of Sebastopol, A.D. 1854-5. The Russians succumbed to the beleaguering armies of England, France and Turkey, and the result was delay in the expansion of the Russian Empire.

Gettysburg, July, A.D. 1863. The deciding battle of the war for the Union. The Confederates under Gen. Lee defeated by the Union forces under Meade.

Sedan, A.D. 1870. The decisive battle of the Franco-German war.

### **Slavery and Serfdom.**

Some of the wealthy Romans had as many as 10,000 slaves. The minimum price fixed by the law of Rome was \$80, but after great victories they could sometimes be bought for a few shillings on the field of battle. The day's wages of a Roman gardener were about 16 cents, and his value about \$300, while a black-

## SLAVERY AND SERFDOM.

smith was valued at about \$700, a cook at \$2,000, an actress at \$4,000, and a physician at \$11,000.

The number of slaves emancipated in the British Colonies in 1834 was 780,993, the indemnity aggregating, in round figures, \$100,000,000. In Brazil, in 1876, there were 1,510,800 slaves, 15 per cent. of the entire population. These were held by 41,000 owners, averaging 37 to each owner. In 1882 the number of slaves was 1,300,000. Owing to the gradual abolition of slavery in Brazil by law it is expected that it will be entirely obsolete in 1900.

### Slavery in the United States.

Year.	Number.	Year.	Number.
1790 .....	697,900	1830 .....	2,009,030
1800 .....	893,040	1840 .....	2,487,500
1810 .....	1,191,400	1850 .....	3,204,300
1820 .....	1,538,100	1860 .....	3,979,700

### Serfdom in Russia.

There were 47,932,000 serfs in Russia in 1861, as follows : Crown serfs, 22,851,000; appanage, 3,326,000; held by nobles, 21,755,000. The cost of redemption was, in round numbers, about \$325,000,000, as follows :

Mortgages remitted .....	\$152,000,000
Government scrip .....	101,000,000
Paid by serfs .....	52,000,000
Balance due .....	20,000,000

The indemnity to the nobles was \$15 per serf. The lands are mortgaged to the state till 1912. The lands ceded to Crown serfs are mortgaged only till 1901. The item of "mortgages remitted" is the amount due by nobles to the Imperial Bank and canceled.

### Austrian Servitude (1840).

	Value.
Labor (two days per week) .....	\$175,000,000
Tithe of crops, etc. ....	60,000,000
Male tribute, timber .....	7,000,000
Female tribute, spun wool .....	9,000,000
Fowl, eggs, butter .....	5,000,000
<b>Total.</b> .....	<b>\$256,000,000</b>

There were 7,000,000 serfs, whose tribute averaged more than \$35 per head, which was, in fact, the rent of their farms. Some Bohemian nobles had as many as 10,000 serfs. The redemption was effected by giving the nobles 5 per cent. Government scrip, and land then rose 50 per cent. in value.

## German Serfs.

In 1848 the state took 60,000,000 acres from the nobles, leaving them still 25,000,000 acres, and gave the former among the serfs. Indemnity as follows: 1. Government scrip, \$900 for each serf family, to nobleman. 2. Land tax, \$15 per annum, transferred to peasant. 3. Interest, \$35 per annum for 47 years, to be paid by peasant to the state, being 4 per cent. on cost of redemption.

## Famous Giants and Dwarfs.

The most noted giants of ancient and modern times are as follows:

Name.	Place.	Height, Feet.	Period.
Goliath.....	Palestine.....	11.0	B.C. 1063.
Galbara.....	Rome.....	9.9	Claudius Cæsar.
John Middleton.....	England.....	9.3	A.D. 1578.
Frederick's Swede.....	Sweden.....	8.4	.....
Cujanus.....	Finland.....	7.9	.....
Gilly.....	Tyrol.....	8.1	.....
Patrick Cotter.....	Cork.....	8.7	1806.
Chang Gow.....	Pekin.....	7.8	1880.

Many of the great men of history have been rather small in stature. Napoleon was only about 5 ft. 4 in., Washington was 5 ft. 7 in. One of the greatest of American statesmen, Alexander H. Stephens, never excelled 115 pounds in weight, and in his old age his weight was less than 100 pounds.

The more notable human mites are named below:

Name.	Height, inches.	Date of Birth.	Place of Birth.
Count Borowlaski.....	39	1739	Warsaw.
Tom Thumb(Chas. S. Stratton)	31	1837	New York.
Mrs. Tom Thumb.....	32	1842	"
Che-Mah.....	25	1838	China.
Lucia Zarate.....	20	1863	Mexico.
General Mite.....	21	1864	New York.

## Evictions in Ireland.

The total number of families evicted in Ireland for 33 years is 482,000 as below:

Years.	Evicted.	Re-admitted.	Net Evictions.
1849-51.....	263,000	73,000	190,000
1852-60.....	110,000	28,000	82,000
1861-70.....	47,000	8,000	39,000
1871-80.....	41,000	6,000	35,000
1881-82.....	21,000	4,000	17,000
Total ..	482,000	119,000	363,000

The number of persons actually evicted was over two millions (say 70,000 per annum).

## **Great Financial Panics.**

The most remarkable crises since the beginning of the present century have been as follows:

- 1814. England, 240 banks suspended.
- 1825. Manchester, failures 2 millions.
- 1831. Calcutta, failures, 15 millions.
- 1837. United States, "Wild-cat" crisis; all banks closed.
- 1839. Bank of England saved by Bank of France. Severe also in France, where 93 companies failed for 6 millions.
- 1844. England. State loans to merchants. Bank of England reformed.
- 1847. England, failures 20 millions; discount 13 per cent.
- 1857. United States, 7,200 houses failed for 111 millions.
- 1866. London, Overend-Gurney crisis; failures exceeded 100 millions.
- 1869. Black Friday in New York (Wall street), September 24.

## **Excessive Heat in the Past.**

In 1303 and 1304 the Rhine, Loire and Seine ran dry. The heat in several French provinces during the summer of 1705 was equal to that of a glass furnace. Meat could be cooked by merely exposing it to the sun. Not a soul dare venture out between noon and 4 p. m. In 1718 many shops had to close. The theaters never opened their doors for three months. Not a drop of water fell during six months. In 1773 the thermometer rose to 118 degrees. In 1778 the heat of Bologna was so great that a great number of people were stifled. There was not sufficient air for the breath, and people had to take refuge under the ground. In July, 1793, the heat again became intolerable. Vegetables were burned up, and fruit dried on the trees. The furniture and wood-work in dwelling-houses cracked and split up; meat went bad in an hour.

## **Summer Heat in Various Countries.**

The following figures show the extreme summer heat in the various countries of the world: Bengal and the African desert, 150° Fahrenheit; Senegal and Guadaloupe, 130°; Persia, 125°; Calcutta and Central America, 120°; Afghanistan and the Arabian desert, 110°; Cape of Good Hope and Utah, 105°; Greece, 104°; Arabia, 103°; Montreal, 103°; New York, 102°; Spain, India, China, Jamaica, 100°; Sierra Leone, 94°; France, Denmark, St. Petersburg, Shanghai, the Burman Empire, Buenos Ayres, and the Sandwich Islands, 90°; Great Britain, Siam, and Peru, 85°; Portugal, Pekin and Natal, 80°; Siberia, 77°; Australia and Scotland, 75°; Italy, Venezuela and Madeira, 73°; Prussia and New Zealand, 70°; Switzerland and Hungary, 66°; Bavaria, Sweden, Tasmania and Moscow, 65°; Patagonia and the Falkland Isles, 55°; Iceland, 45°; Nova Zembla, 34°.

### Severest Cold on Record.

- 1234. Mediterranean frozen; traffic with carts.
- 1420. Bosphorus frozen.
- 1468. Wine at Antwerp sold in blocks.
- 1658. Swedish artillery crossed the Sound.
- 1766. Snow knee-deep at Naples.
- 1789. Fahrenheit thermometer marked 23° below zero at Frankfurt, and 36° below at Basle.
- 1809. Moscow, 48° below zero, greatest cold recorded there; mercury frozen.
- 1829. Jakoutsk, Siberia, 73° below zero on the 25th of January; greatest cold on record.
- 1846. December marked 25° below zero at Pontarlier; lowest ever marked in France.
- 1864. January, Fahrenheit stood at zero in Turin; greatest cold recorded in Italy.

Captain Parry, in his Arctic explorations, suffered for some time 51 degrees below zero. Frost is diminishing in Canada with the increase of population, as shown by the fact that Hudson's Bay was closed, from 1828-'37, 184 days per annum, and from 1871-'80 only 179 days per annum.

### The Great Famines of History.

Walford mentions 160 famines since the 11th century, namely: England, 57; Ireland 34; Scotland, 12; France, 10; Germany, 11; Italy, etc., 36. The worst in modern times have been:

Country.	Date.	No. of Victims.
France .....	1770	48,000
Ireland .....	1847	1,029,000
India .....	1866.	1,450,000

Deaths from hunger and want were recorded as follows in 1879, according to Mulhall: Ireland, 3,789; England, 312; London, 101; France, 260. The proportion per 1,000 deaths was, respectively, 37.6, .6, 1.2, .3.

### Remarkable Plagues of Modern Times.

Date.	Place.	Deaths.	Weeks.	Deaths per Week.
1656 ...	Naples .....	380,000	28	10,400
1665 ...	London .....	68,800	33	2,100
1720 ...	Marseilles .....	39,100	36	1,100
1771 ...	Moscow .....	87,800	32	2,700
1778 ...	Constantinople .....	170,000	18	9,500
1798 ...	Cairo .....	88,000	25	3,500
1812 ...	Constantinople .....	144,000	13	11,100
1834 ...	Cairo .....	57,000	18	3,200
1835 ...	Alexandria .....	14,900	17	900
1871 ...	Buenos Ayres .....	26,300	11	2,400



## Height of Noted Cathedrals, Monuments, etc.

	Feet.		Feet.
Eiffel Tower, Paris.....	989	Cathedral, Bologna.....	321
Washington Monument.....	555	“ Norwich, Eng. ....	309
Pyramid, Cheops, Egypt....	543	“ Chester, Eng. ....	300
Cathedral, Cologne.....	511	“ Lincoln, Eng. ....	300
“ Antwerp.....	476	Capitol, Washington .....	300
“ Strasburg .....	474	St. James' Cathedral, Toronto.	316
Tower, Utrecht.....	464	Trinity Church, New York.	283
Steeple, St. Stephen's, Vienna	460	Cathedral, Mexico.....	280
Pyramid, Khafra, Egypt....	456	“ Montreal .....	280
St. Martin's Church, Bavaria.	456	Campanile Tower, Florence.	276
Chimney, Port Dundas, Glas-		Column, Delhi .....	260
gow.....	454	Cathedral, Dantzic.....	250
St. Peter's, Rome .....	448	Porcelain Tower, Nankin..	248
Notre Dame, Amiens. ....	422	Custom House, St. Louis. .	240
Salisbury Spire, England....	406	Canterbury Tower, Engl'd.	235
Cathedral, Florence.....	380	Notre Dame, Paris.....	232
“ Cremona.....	372	Chicago Board of Trade....	230
“ Freiburg.....	367	St. Patrick's, Dublin .....	226
St. Paul's, London .....	365	Cathedral, Glasgow.....	225
Cathedral, Seville.....	360	Bunker Hill Monument....	220
Pyramid, Sakkarah, Egypt..	356	Notre Dame, Montreal....	220
Cathedral, Milan .....	355	Cathedral, Lima .....	220
Notre Dame, Munich.....	348	“ Rheims .....	220
Invalides, Paris .....	347	“ Garden City, L. I. ....	219
Parliament House, London..	340	St. Peter and Paul, Phila. .	210
Cathedral, Magdeburg ....	337	Washington Mon., Balto...210	
St. Patrick's, New York....	328	Vendome Column, Paris...153	
St. Mark's, Venice.....	328		

## Principal of the Public Debt.

1955 July 1....\$	35,586,858	56	1872 July 1 ..	\$2,253,251,328	78
1856 “ ....	31,972,537	90	1873 “ ....	2,234,482,993	20
1857 “ ....	28,699,831	85	1874 “ ....	2,251,690,468	43
1858 “ ....	44,911,881	03	1875 “ ....	2,232,284,531	95
1859 “ ....	58,496,837	88	1876 “ ....	2,180,395,067	15
1860 “ ....	64,842,287	88	1877 “ ....	2,205,301,392	10
1861 “ ....	90,580,873	72	1878 “ ....	2,256,203,892	53
1862 “ ....	524,176,412	13	1879 “ ....	2,245,495,072	04
1863 “ ....	1,119,772,138	63	1880 “ ....	2,120,415,370	63
1864 “ ....	1,815,784,370	57	1881 “ ....	2,069,013,569	58
1865 “ ....	2,680,647,869	74	1882 “ ....	1,918,312,994	03
1866 “ ....	2,773,236,173	69	1883 “ ....	1,884,171,728	07
1867 “ ....	2,678,126,103	87	1884 “ ....	1,830,528,923	57
1868 “ ....	2,611,687,851	19	1885 “ ....	1,876,424,275	14
1869 “ ....	2,588,452,213	94	1886 “ ....	1,756,445,205	78
1870 “ ....	2,480,672,427	81	1887 Dec.1....	1,664,461,536	38
1871 “ ....	2,353,211,332	32	1888 “ ....	1,680,917,706	23

## Religion in America.

	Churches.	Ministers.	Communi- cants.
Adventists.....	1,344	775	91,769
Baptists.....	37,156	26,545	3,336,553
Congregationalists.....	3,936	8,723	387,619
Friends.....	392	200	96,000
German Evangelical Church.....	550	430	80,000
Lutherans.....	6,130	3,429	785,987
Methodists.....	41,271	24,485	3,943,875
Mennonites.....	500	450	80,000
Moravians.....	84	70	9,928
New Jerusalem.....	87	92	3,994
Presbyterians.....	11,783	8,834	966,437
Protestant Episcopal.....	3,109	3,664	351,699
Reformed.....	1,942	1,320	243,825
Roman Catholics.....	6,241	6,546	6,832,954
Schwendfeldians.....			700
Unitarians.....	362	434	20,000
Universalists.....	719	713	36,238
Total in United States.....	115,610	81,717	17,267,878

## Indian Country.

The entire extent of territory now in a state of reservation for Indian purposes, including all portions of the Indian Territory, whether in fact occupied or unoccupied by Indians, is 112,413,440 acres, being equivalent to an average of 456 acres for each Indian, computed on the last reported number of the total population, including those estimated as outside the reservations. Of this area about 81,020,129 acres are within the scope of the general allotment law of 1887, and afford an average for the population residing upon such lands, amounting to 173,985, of about 465 acres to each. It will be seen that, by the execution of the general allotment law and breaking up of the reservations, a wide area of the public domain will be opened to settlement.

The Cherokees, Creeks, Choctaws, Chickasaws, and Seminoles, constituting the five civilized tribes; the Osages, Miamis, Peorias, and Sacs and Foxes of the Indian territory, and the Seneca nation in New York are excepted from the provisions of the allotment act. The territory occupied by them embraces 21,969,695 acres, not counting therewith the 6,024,239 acres of the Cherokee outlet, the 1,887,801 acres known as Oklahoma, and the 1,511,576 acres lying in the Indian territory south of the north fork of the Red river. The number of these excepted Indians is shown by the reports to be 72,110 in all.

## Land Monopoly.

The following is a table of the leading alien holders of lands in the United States, with amount of holdings in acres :

An English syndicate, No. 3, in Texas .....	3,000,000
The Holland Land Co., New Mexico .....	4,500,000
Sir Edw. Reid and a syndicate, Florida .....	2,000,000
English syndicate in Mississippi .....	1,800,000
Marquis of Tweedale. ....	1,750,000
Phillips, Marshall & Co., London .....	1,300,000
German-American syndicate, London .....	750,000
Bryan H. Evans, of London .....	700,000
Duke of Sutherland .....	425,000
British Land Company in Kansas .....	320,000
Wm. Wharley, M. P., Peterboro, Eng .....	310,000
Missouri Land Co., Edinburgh, Scotland. ....	300,000
Robert Tennent, of London .....	230,000
Dundee Land Co., Scotland. ....	247,000
Lord Dunmore. ....	120,000
Benjamin Neugas, Liverpool .....	100,000
Lord Houghton in Florida .....	60,000
Lord Dunraven in Colorado .....	60,000
English Land Company in Florida .....	50,000
English Land Company in Arkansas .....	50,000
Albert Peel, M. P., Leicestershire, Eng .....	10,000
Sir J. L. Kay, Yorkshire, Eng. ....	5,000
Alexander Grant, of London, in Kans .....	35,000
English syndicate, Wisconsin .....	110,000
M. Ellerhauser, of Halifax, in W. Va .....	600,000
A Scotch syndicate in Florida .....	500,000
A. Boysen, Danish consul in Milwaukee. ....	50,000
Missouri Land Company, of Edinburgh .....	165,000
<b>Total .....</b>	<b>20,647,000</b>

To these syndicate holdings should be added the following: The Arkansas Valley Company in Colorado, a foreign corporation, whose inclosures embrace upward of 1,000,000 acres; the Prairie Cattle Company (Scotch) in Colorado, upwards of 1,000,000; H. H. Metcalf, River Bend, Col., 200,000; John W. Powers, Colorado, 200,000; McDaniel & Davis, Colorado, 75,000; Routhcler & Lamb, Colorado, 40,000; J. W. Frank, Colorado, 40,000; Garnett & Langford, Colorado, 30,000; E. C. Tane, Colorado, 50,000; Leivesy Brothers, Colorado, 150,000; Vrooman & McFife, Colorado, 50,000; Beatty Brothers, Colorado, 40,000; Chick, Brown & Co., Colorado, 30,000; Reynolds Cattle Company, Colorado, 50,000; several other cases in Colorado, embracing from 10,000 to 30,000; Coe & Carter, Nebraska, fifty miles of fence; J. W. Wilson, Nebraska, forty miles; J. W. Boster, twenty miles; William Humphrey, Nevada, thirty miles; Nelson & Son, Nevada, twenty-two miles; Kennebec Ranch, Nebraska, from 20,000 to 50,000 acres.

## The American Indian.

The total Indian population of the United States in 1887, exclusive of Alaska, was 247,761.

The Indian reservations in 1886 amounted to 135,978,345 acres, or 212,466 square miles approximately.

The popular idea that there was originally a large Indian population in the territory now covered by the United States, and that the numbers have decreased with each succeeding generation, as it came in contact with the fire-arms and fire-water of the white man's civilization, is probably erroneous. There are no statistics available, but careful observation and comparison has induced such students of Indian history as Mr. J. P. Dunn, Jr., to fix the Indian population of our present Territory, at the time of European colonization, at 530,000 approximately, and Mr. Elbridge S. Brooks, the latest writer upon the Indians, materially modifies those figures, expressing the opinion that in 1600 there were not over half a million of Indians between the shores of the Gulf of Mexico and the Arctic Ocean, and, in fact, that the Indian population of today is substantially the same in volume that it was when Columbus discovered America, or Leif Ericson either.

## Illiteracy.

The last census enumerates 36,761,607 persons of ten years of age and upward. Of this number 4,923,451, or 13.4 per cent., are returned as unable to read, and 6,239,958, or 17 per cent., as unable to write. The following States show over 40 per cent. of their population as unable to write: Alabama, 60; Florida, 43; Georgia, 50; Louisiana, 49; Mississippi, 50; New Mexico, 65; North Carolina, 48; South Carolina, 55; and Virginia, 41, and the following States with less than 5 per cent. unable to read: Connecticut, 4; Dakota, 3; Illinois, 4; Indiana, 5; Iowa, 2; Kansas, 4; Maine, 4; Michigan, 4; Minnesota, 4; Montana, 5; Nebraska, 2½; New Hampshire, 4; New Jersey, 5; New York, 4; Ohio, 4; Oregon, 4; Pennsylvania, 5; Utah, 5; Virginia, 5, and Wisconsin, 4.

## Average of Import Duties in Various Countries.

	Ratio to Imports. Per Cent.		Ratio to Imports. Per Cent.
United Kingdom.....	5½	Belgium.....	1½
France.....	6½	Denmark .....	9
Germany.....	6	Sweden and Norway..	12
Russia.....	18	Europe.....	7¼
Austria.....	5	United States.....	28
Italy.....	11	Canada.....	15
Spain.....	24	Australia.....	13
Portugal.....	26	Brazil.....	44
Holland.....	1	Argentine Republic..	37

## **Organized Labor in the United States.**

The first strike in this country occurred in New York City in 1803, when a number of sailors struck for an advance of wages.

1806. The tailors this year established the first organization in the United States, in the present form of a trades union.

1819. The hatters organized a union of their craft.

1825-30. The Columbia Charitable Association of Shipwrights and Caulkers was organized.

1825. As early as this year the questions of shorter hours of work, better wages and protection of operatives in factories were being agitated, and during the years that immediately followed, social unions of different crafts were springing up in cities and manufacturing centers.

1828. The Workingmen's Party, a local political organization in New York, Boston, Philadelphia and other cities, appeared.

1829. At the State election in New York a workingmen's ticket was put in the field, and elected one candidate to the Legislature—Ebenezer Ford, of New York.

1831. First local unions of printers.

1831. The New England Association of Farmers, Mechanics and Workingmen formed.

1832. Ten-hour movement among the shipwrights and caulkers throughout New England cities was followed by strikes, which proved unsuccessful.

1834. A mechanics' convention met at Utica, N. Y., and protested against convict labor.

1835. From this year onward strikes occurred in the different trades from time to time, with varying results.

1840. About this time many trades were organized, and some were enrolled in Labor Reform associations.

1840. President Van Buren established the ten-hour system for all employes of the Government in the Navy Yards.

1844-45. First effort of co-operation in connection with the labor movement originated in Boston.

1845. The New England Workingmen's Association was organized in Boston.

1845, October 12. The first Industrial Congress of the United States convened in New York.

1847. New Hampshire passed a law making ten hours a legal day's work.

1850. The labor agitation at this period was principally directed to a reduction in hours of work by legal enactment. It entered into politics and many candidates were run on that issue.

1850-60. National and international trades unions were organized, granting charters to local bodies and organizing new branches, from Maine to California.

1861-65. The eight-hour movement obtained great impetus during the war.

## HISTORY OF ORGANIZED LABOR.

1866. There was a revival of the labor movement, and many new organizations were formed.

1864. The Cigarmakers' International Union was formed.

1866. An eight-hour bill for the benefit of Government employes was introduced in Congress, and finally became a law in 1868 by the signature of President Johnson.

1866. First National Labor Congress met at Baltimore, August 20. This body met annually in different cities for several years.

1869. The Knights of Labor were organized in Philadelphia.

The labor movement from 1870 to the present time has been a continuous growth in the number of trades unions and increase in their membership, attended by strikes, lock-outs and settlements by arbitration, the agitation for labor legislation and efforts at political party organization. Congress created a National Bureau of Labor in 1884.

Most of the trades unions organizations in the United States were represented at a convention held at Columbus, O., in December, 1886, when a national organization was formed, a constitution adopted and the title taken of The American Federation of Labor. This body and the Order of Knights of Labor of America (which is a secret order) are the two principal national labor organizations of the United States.

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THE total number of newspapers published in the world at present is estimated at about 40,000, distributed as follows; United States, 15,000; Germany, 5,500; Great Britain, 5,000, France, 4,092; Japan, 2,000; Italy, 1,400; Austria-Hungary, 1,200; Asia, exclusive of Japan, 1,000; Spain, 850; Russia, 800; Australia, 700; Greece, 600; Switzerland, 450; Holland, 300; Belgium, 300; all others, 1,000. Of these about half are printed in the English language.

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COAL IN THE UNITED STATES.—This country has an area of between 300,000 and 400,000 square miles of known coal fields, from which 100,000 tons is mined yearly—enough to belt the earth at the equator with a ring five and a half feet thick by five and a half feet wide. The quantity "in sight" is estimated to be sufficient to supply the whole world for a period of fifteen hundred to two thousand years.

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ROMAN money mentioned in the New Testament, reduced to English and American standard :

	£	s.	d.	far.	\$	cts.
A mite . . . . .	0	0	0	0.75	0	00.354
A farthing, about . . . . .	0	0	0	1 50	0	00.687
A penny, or denarius . . . . .	0	0	7	2.	0	13.75
A pound, or mina . . . . .	3	2	6	0.	13	75.

# PARLIAMENTARY LAW AT A GLANCE.

## List of Motions Arranged According to their Purpose and Effect.

[Letters refer to rules below.]

### *Modifying or amending.*

8. To amend or to substitute, or to divide the question - - K

### *To refer to committee.*

7. To commit (or recommit) - - - - - D

### *Deferring Action.*

6. To postpone to a fixed time - - - - - C

4. To lay on the table - - - - - A E G

### *Suppressing or extending debate.*

5. For the previous question - - - - - A E M

To limit, or close, debate - - - - - A M

To extend limits of debate - - - - - A

### *Suppressing the question.*

Objection to consideration of question - - A H M N

9. To postpone indefinitely - - - - - D E

4. To lay upon the table - - - - - A E G

### *To bring up a question the second time.*

To reconsider { debatable question - - - D E F I

{ undebatable question - - - A E F I

### *Concerning Orders, Rules, etc.*

3. For the orders of the day - - - - - A E H N

To make subject a special order - - - - - E M

To amend the rules - - - - - E M

To suspend the rules - - - - - A E F M

To take up a question out of its proper order - - - A E

To take from the table - - - - - A E G

Questions touching priority of business - - - - - A

### *Questions of privilege.*

Asking leave to continue speaking after indecorum - - - A

Appeal from chair's decision touching indecorum A E H L

Appeal from chair's decision generally - - - E H L

Question upon reading of papers - - - - - A E

Withdrawal of a motion - - - - - A E

### *Closing a meeting.*

2. To adjourn (in committees, to rise), or to take a } - A E F

recess, without limitation - - - - - }

1. To fix the time to which to adjourn - - - - - B

**Order of Precedence.**—The motions above numbered 1 to 9 take precedence over all others in the order given, and any one of them, except to amend or substitute, is in order while a motion of a lower rank is pending.

**RULE A.** Undebatable, but remarks may be tacitly allowed.

**RULE B.** Undebatable if another question is before the assembly.

**RULE C.** Limited debate allowed on propriety of postponement only.

**RULE D.** Opens the main question to debate. Motions not so marked do not allow of reference to main question.

**RULE E.** Cannot be amended. Motion to adjourn can be amended when there is no other business before the house.

**RULE F.** Cannot be reconsidered.

**RULE G.** An affirmative vote cannot be reconsidered.

**RULE H.** In order when another has the floor.

**RULE I.** A motion to reconsider may be moved and entered when another has the floor, but the business then before the house may not be set aside. This motion can only be entertained when made by one who voted originally with the prevailing side. When called up it takes precedence of all others which may come up, excepting only motions relating to adjournment.

**RULE K.** A motion to amend an amendment cannot be amended.

## PARLIAMENTARY LAW.

**RULE L.** When an appeal from the chair's decision results in a tie vote, the chair is sustained.

**RULE M.** Requires a two-thirds vote unless special rules have been enacted.

**RULE N.** Does not require to be seconded.

### GENERAL RULES.

No motion is open for discussion until it has been stated by the chair.

The maker of a motion cannot modify it or withdraw it after it has been stated by the chair, except by general consent.

Only one reconsideration of a question is permitted.

A motion to adjourn, to lay on the table, or to take from the table, cannot be renewed unless some other motion has been made in the interval.

On motion to strike out the words, "Shall the words stand part of the motion?" unless a majority sustains the words, they are struck out.

On motion for previous question, the form to be observed is, "Shall the main question be now put?" This, if carried, ends debate.

On an appeal from the chair's decision, "Shall the decision be sustained as the ruling of the house?" The chair is generally sustained.

On motion for orders of the day, "Will the house now proceed to the orders of the day?" This, if carried, supersedes intervening motions.

When an objection is raised to considering questions, "Shall the question be considered?" objections may be made by any member before debate has commenced, but not subsequently.

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**LETTER COMBINATIONS.**—When King Stanislaus of Poland, then a young man, came back from a journey, the whole Lescinsian House gathered together at Lissa to receive him. The schoolmaster, Jablowsky, prepared a festival in commemoration of the event, and had it end with a ballet performed by thirteen students, dressed as cavaliers. Each had a shield, upon which one of the letters of the words "*Domus Lescinia*" (The Lescinsian House) was written in gold. After the first dance, they stood in such a manner that their shields read "*Domus Lescinia*;" after the second dance, they changed order, making it read, "*Ades incohumis*" (Unharm'd art thou here); after the third, "*Mane sidus loci*" (Continue the star of this place); after the fourth, "*Sis columna Dei*" (Be a pillar of God); and finally, "*Ascende solium*" (Go! ascend the throne). Indeed, these two words allow of 1,556,755,200 transpositions; yet that four of them convey independent and appropriate meanings is certainly very curious.

**TO TELL PURE WATER.**—The color, odor, taste and purity of water can be ascertained as follows: Fill a large bottle made of colorless glass with water; look through the water at some black object. Pour out some of the water and leave the bottle half full; cork the bottle and place it for a few hours in a warm place; shake up the water, remove the cork, and critically smell the air contained in the bottle. If it has any smell, particularly if the odor is repulsive, the water should not be used for domestic purposes. By heating the water an odor is evolved that would not otherwise appear. Water fresh from the well is usually tasteless, even if it contains a large amount of putrescible organic matter. All water for domestic purposes should be perfectly tasteless, and remain so even after it has been warmed, since warming often develops a taste in water which is tasteless when cold.

**HAND GRENADES.**—Take chloride of calcium, crude, 20 parts; common salt, 5 parts; and water, 75 parts. Mix and put in thin bottles. In case of fire, a bottle so thrown that it will break in or very near the fire will put it out. This mixture is better and cheaper than many of the high-priced grenades sold for the purpose of fire protection.

**HOW TO GET RID OF RATS.**—Get a piece of lead pipe and use it as a funnel to introduce about 1½ ounces of sulphide of potassium into any outside holes tenanted by rats, not to be used in dwellings. To get rid of mice use tartar emetic mingled with any favorite food; they will eat, sicken and take their leave.



## Great Fires and Conflagrations.

London, Sept. 2-6, 1666.—Eighty-nine churches, many public buildings and 13,200 houses destroyed; 400 streets laid waste; 200,000 persons homeless. The ruins covered 436 acres.

New York, Dec. 16, 1835.—600 buildings; loss, \$20,000,000. Sept. 6, 1839.—\$10,000,000 worth of property.

Pittsburgh, April 10, 1845.—1,000 buildings; loss, \$6,000,000.

Philadelphia, July 9, 1850.—350 buildings; loss, \$1,500,000; 25 persons killed; 9 drowned; 120 wounded.

St. Louis, May 4, 1851.—Large portion of the city burned; loss, \$15,000,000.

San Francisco, May 3-5, 1851.—2,500 buildings; loss, \$3,500,000; many lives lost. June 22, 1851.—500 buildings; loss, \$3,000,000.

Santiago (Spain), Dec. 8, 1863.—A fire in the church of the Campana, beginning amid combustible ornaments; 2,000 persons killed, mostly women.

Charleston, S. C., Feb. 17, 1865.—Almost totally destroyed, with large quantities of naval and military stores.

Richmond, Va., April 2 and 3, 1865.—In great part destroyed by fire at time of Confederate evacuation.

Portland, Me., July 4, 1866.—Almost entirely destroyed; loss, \$15,000,000.

Chicago, Oct. 8 and 9, 1871.—3½ square miles laid waste; 17,450 buildings destroyed; 200 persons killed; 98,500 made homeless. July 14, 1874.—Another great fire; loss, \$4,000,000.

Great forest fires in Michigan and Wisconsin, October 8-14, 1871.—2,000 lives lost.

Boston, Nov. 9-11, 1872.—800 buildings; loss, \$73,000,000; 15 killed.

Fall River, Mass., Sept. 19, 1874.—Great factory fires; 60 persons killed.

St. John, N. B., June 21, 1876.—Loss, \$12,500,000.

Brooklyn Theater burned, Dec. 5, 1876.—300 lives lost.

Seattle and Spokane, Wash., 1889.—About \$10,000,000 each.

## Great Floods and Inundations.

An inundation in Cheshire, England, A.D. 353.—3,000 persons perished.

Glasgow, A.D. 758.—More than 400 families drowned.

Dort, April 17, 1421.—72 villages submerged; 100,000 people drowned.

Overflow of the Severn, A.D. 1483, lasting ten days.—Men, women and children carried away in their beds, and the waters covered the tops of many mountains.

General inundation in Holland, A.D. 1530.—By failure of dikes: 400,000 said to have been drowned.

At Catalonia, A.D. 1617.—50,000 drowned.

Johnstown, Pa., May 31, 1889.—By the bursting of a huge reservoir on the mountains, the town was almost entirely destroyed, and about 6,000 persons perished. The water in its passage to Johnstown descended about 250 feet. The theoretical velocity due to this descent would be about 127 feet per second or between 86 and 87 miles an hour. According to the best accounts from 15 to 17 minutes were occupied in the passage to Johnstown, a distance of about twelve miles. Thus the average velocity could not have been far short of 50 miles an hour. The impetus of such a mass of water was irresistible. As the flood burst through the dam it cut trees away as if they were stalks of mullein.

(I.)

# THE WORLD'S HISTORY AT A GLANCE.

Compact Diagrams Suggesting Dates, Names and Events.  
Designed to Aid the Memory and for  
Ready Reference.

B. C. FROM ABRAHAM TO CYRUS.			
	ASSYRIA. CHALDÆA. BABYLONIA.	HEBREWS.	EGYPT.
1900		96. Abraham born.	
1800	50. Ismi-Dagon.	21. Call of Abraham.	22. Egyptian alpha- bet invented.
1700		6. Jacob removes in- to Egypt.	Rameses, king.
1600			18. Sesostris.
1500	Arabians subdue Chaldæa.	71. Moses born.	
1400		91. Exodus from Egypt.	
1300		51. Hebrews enter Canaan.	
1200	Semiramis.	45. Gideon conquers the Midianites.	8. Sethos.
1100	50. Nebuchadnezzar I. 30. Tigleth-Pileser I.	36. Samson defeats the Philistines.	
1000		95. Saul, king. 55. David, king. 15. Solomon, king.	82. Cheops builds the great Pyra- mid.
900		90. Queen of Sheba visits Solomon. 75. Death of Solomon. Two kingdoms formed — Judah and Israel.	78. Shishak. 71. Shishak invades Judah; plunders the Temple.
800	75. Sardanapalus. 70. Assyrians con- quer Phœnicia.	92. Syrians besiege Samaria.	

(II.)	47. Nabonassar.	71. Assyrians invade Israel.	11. Invaded by Sennacherib.
	28. Shalmaneser.	21. The ten tribes carried into captivity.	
	23. Invades Phœnicia.	10. Sennacherib's army of 185,000 destroyed in one night in Judea.	
	17. Sennacherib.		
	9. Asarhadon.		
700			
	26. Nabopolassar.	5. Nebuchadnezzar invades Judea.	11. Nechao II. loses 120,000 men trying to cut a canal from the Nile to Red Sea.
	5. Nebuchadnezzar the Great.		
600			
	87. Nebuchadnezzar invades Phœnicia.	87. Jerusalem destroyed. Jews led away into captivity	44. Apries king.
	55. Belshazzar.		72. Assyrians devastate Egypt.
	38. Cyrus the Mede, king of Persia, takes Babylon.		35. Egypt submits to Cyrus.
	36. Jews returned to Jerusalem.		
	29. Death of Cyrus.		

### FROM CYRUS TO ALEXANDER.

	PERSIA.	GREECE.	MACEDON.	ROME.
	21. Darius I.	4. Sardis burnt by the Greeks.	8. Subdued by Darius.	10. The Tarquins vanquished.
500				Republic.
	94. Darius invades Greece.	90. Miltiades defeats the Persians at Marathon.		91. Coriolanus vanquished.
	85. Xerxes invades Greece.	80. Battles of Thermopylae and Salamis.		89. Besieges Rome.
	79. Persians retreat home.	79. Battles of Mycale and Plataea.		88. Retires at his mother's suit.
	65. Artaxerxes I Battle of Cunaxa; Cyrus the Younger slain.	31. Peloponnesian war.		58. Cincinnatus, dictator.
		13. Athens invades Sicily.		49. Virginus kills his daughter to save her honor.
400				

(III.)

94. Persians aid Athenians in battle of Cnidus

36. Darius III. Codomanus.

34. Persia invaded by Alexander. Battle of Granicus.

31. Battle of Arbela.

30. Darius assassinated.

28. Alexander invades India.

24. Alexander dies at Babylon.

95. Corinthian war.

87. Peace among Greeks.

78. Theban war. Epaminondas, Theban General.

39. War btwn Athens and Macedon.

35. Greeks conquered by Alexander.

33. Battle of Issus. Conquest of Syria. Conquest of Egypt. Siege of Tyre.

98. Amyntas.

58. Philip II.

38. Defeat of Athenians and Thebans at Cheronea.

36. Alexander.

50. Rome burnt by the Gauls.  
70. Civil war between Patricians and Plebeians.  
40. War with Latins.

32. Treaty with Alexander.

### FROM ALEXANDER TO AUGUSTUS.

#### EGYPT.

22. Ptolemy I.  
1. Battle of Ipsus.

84. Ptolemy Philadelphus.

46. Ptolemy Evergetes. Egyptians conquer Syria.

21. Ptolemy Philopater.

4. Ptolemy Epiphanes.

#### SYRIA.

23. Seleucus I.

83. Antiochus I.

46. Seleucus II.  
26. Seleucus III.

23. Antiochus the Great.

#### MACEDON.

88. Lysimachus, King of Thrace, subjects Macedon.

20. Philip V.  
11. War with Rome.

#### ROME.

21. Romans defeated by Pantius.

81. War with Pyrrhus, King of Epirus.

64. First Punic war.

56. Defeat of Carthaginians.

16. Battle of Cannæ.

2. Scipio carries the war into Africa.

300

200



(IV.)

80. Ptolemy Philometer.

45. Ptolemy Physcon.

17. Ptolemy Lathyrus.

98. Independent.

75. Antiochus IV.

70. Antiochus plunders Jerusalem.

30. Antiochus VII.

23. Antiochus VIII.

12. Antiochus IX.

99. Second war with Rome.

72. Third Roman war.

68. Battle of Pydna

Macedon conquered.

92. War with Syria.

49. Third Punic war.

146. Carthage destroyed

33. Spain subjugated.

21. Agrarian trouble.

2. Servile war.

100

82. Thebes destroyed.

65. Ptolemy Auletus.

51. Ptolemy Bacchus and Cleopatra.

43. Cleopatra.

31. Battle of Actium.

30. Egypt a Roman province.

69. Antiochus XII.

65. Antiochus defeated by Pompey. Syria subject to Rome.

91. Social war.

88. War with Pontus.

87. Civil war between Scylla and Marius.

63. Cicero defeats a conspiracy of Catiline.

60. First triumvirate — Julius

Cæsar, Pompey and Crassus.

55. Cæsar invades Britain.

51. Gaul becomes a Roman province.

48. Civil war. Battle of Pharsalia.

44. Assassination of Julius Cæsar

B. C. 27. Octavius, emperor, under the title of Augustus Cæsar.

BIRTH OF CHRIST.

A. D.

FROM AUGUSTUS TO CHARLEMAGNE.

54. Nero. 70. Destruction of Jerusalem.

79. Eruption of Mount Vesuvius, covering Pompeii and Herculaneum.

100

62. Fourth persecution. 97. Battle of Lyons.

200

62. Dreadful pestilence.

300

23. Constantine sole emperor.

(V.)

WESTERN EMPIRE.

EASTERN EMPIRE.

- 400 Goths under Alaric overrun Italy.
10. Rome besieged and sacked.
19. Romans leave Britain.
55. Anglo-Saxons conquer Britons.
72. Visigoths conquer Spain.
76. Odoacer captures Rome. End of the Empire.

8. Theodosius II.
47. Tribute paid to Attila, King of the Huns.
50. Marcian.

86. Franks in Gaul.  
89. Ostrogoths in Italy.
- 500 7. Kingdom of the Franks founded by Clovis.
52. Ostrogoths expelled from Italy.
96. Lombards overrun Italy.
- 600 56. Clovis II, king of France.
62. Lombards defeat Constans II, in Italy.
97. Conquest of Northern Africa by the Saracens.
- 700 11. Saracens invade Spain.  
32. Battle of Tours.  
Saracens defeated by the Franks under Charles Martel.  
74. Charlemagne conquers the Lombards.

2. Empire ravaged by the Persians.
29. Justinian code published.
81. Slavonians in Thrace.
12. Mohammed spreads his doctrines.
14. Persians ravage Syria and Palestine.
40. Saracens invade Egypt.
73. Siege of Constantinople.
20. Saracens defeated at Constantinople.
30. Iconoclasts burn and destroy works of art.

- 800 Charlemagne emperor of the West.

11. Bulgarians defeat the Greek emperor.

**(VI.)****FROM CHARLEMAGNE TO NAPOLEON.**

	<b>ENGLAND.</b>	<b>FRANCE.</b>	<b>GERMANY.</b>	<b>ELSEWHERE.</b>
<b>800</b>	28. Egbert king. 71. Alfred the Great.	51. Pillaged by Northmen.	14. Louis the Debonnaire. 75. Charles the Bald.	9. Death of Haroun al Raschid, the Caliph.
<b>900</b>	24. Athelstan. 79. Edward the Martyr assassinated.	12. Rollo, Duke of Normandy. 87. Hugh Caput, King of France	Henry I. 34. Danes defeated. 62. Otho I. unites Italy and Germany.	70. Russians invade Thrace and are defeated.
<b>1000</b>	13. Svenn conquers England. 17. Canute king. 42. Edward the Confessor. 66. Battle of Hastings. William the Conqueror. 89. William II.	98. War with England.	56. Henry IV. 77. Henry IV. goes to Canossa and submits to the Pope.	65. Turks capture Jerusalem. 96. First Crusade. 99. Crusaders take Jerusalem.
<b>1100</b>	Henry I. 35. Stephen. 54. The Plantagenets. Henry II. 71. Invasion of Ireland. 89. Richard Cœur de Lion. 99. John Lackland.	8. Louis the Fat. 37. Louis VII. 80. Philip II.	6. Henry V. 38. Conrad III. 52. Frederick I. Barbarossa. 54. Invades Italy 62. Milan destroyed. 76. Battle of Legnano. Defeat of Barbarossa.	25. Venice flourishes. 46. Second Crusade. 59. War of the Guelphs and Ghibellines. 72. Saladin's conquest in Asia. 87. Third Crusade. 94. Fourth Crusade.
<b>1200</b>	15. Magna Charta signed. 16. Henry III. 72. Edward I. 82. Conquest of Wales. 97. Sir William Wallace in Scotland.	14. Battle of Bouvines. 23. Louis VIII. 26. Louis IX. 70. Philip III. 85. Philip IV.	41. Hanseatic League formed. 73. The Hapsburgs. Rudolph I. 92. Adolph. 98. Albert I.	Fifth Crusade. 17. Sixth Crusade. 18. Genghis Khan, the Mogul, conqueror of Asia. 68. Eighth and last Crusade.



1300	ENGLAND.	FRANCE.	GERMANY.	ELSEWHERE.
	7. Edward II.	14. Louis X.	7. Revolt of the Swiss. William Tell.	11. Knights Templar suppressed.
	14. Battle of Bannockburn.	16. Philip V.		40. Battle of Tarifa in Spain—Moors defeated.
	27. Edward III.	21. Charles IV.	15. Battle of Morgarten.	
	46. Battle of Cressy.	28. Philip VI.		47. Rienzi frees Rome.
	56. Battle of Poitiers.	50. John II.	49. Charles IV. of House of Luxembourg.	96. Battle of Nicopolis. Christian s defeated.
	77. Richard II.	64. Charles V.	78. Wenceslaus.	
	99. Henry IV. of Lancaster.	80. Charles VI.		
1400	13. Henry V. War with France.	22. Charles VII.	10. Sigismund.	2. Battle of Angora. Tamerlane captures Bajazet.
	15. Battle of Agincourt.	29. Joan of Arc raises siege of Orleans.	38. House of Austria. Albert II., III.	22. Amurath II. consolid'es Ottoman Empire.
	22. Henry VI.	51. English expelled from France.		42. Battle of Vasag. Turks beaten by Hungarians.
	53. War of the Roses.	61. Louis XI.	40. Frederick.	53. Amurath II. captures Constantinople.
	61. House of York. Edward IV.	81. Charles VIII.	93. Maximilian I.	56. Battle of Belgrade.
	83. Edward V. Richard III.	96. Louis XII.		92. Columbus discovers America.
	85. The Tudors. Henry VII.			
1500	9. Henry VIII.	13. English invasion.	17. Reformation—Luther.	21. Wars of Charles V. in Italy.
	13. Battle of Flodden.	15. Francis I.	19. Charles V.	53. Ivan IV., Russia.
	36. Ann Boleyn beheaded.	25. Battle of Pavia.	21. Diet of Worms.	56. Philip II. in Spain.
	47. Edward VI.	47. Henry II.	56. Abdication of Charles V.	65. Netherlands revolt.
	53. Mary.	59. Francis II.	56. Ferdinand I.	
	58. Elizabeth.	60. Huguenot war.		



VIII.	ENGLAND.	FRANCE.	GERMANY.	ELSEWHERE.
	87. Mary of Scots beheaded.	72. Massacre St. Bartholomew's day.	64. Maximilian II.	71. Battle of Lepanto.
	88. Spanish Armada.	84. Henry III.	76. Rudolph II.	81. Holland a republic.
		89. Henry IV. of Navarre.		
1600	3. The Stuarts. James I.	10. Louis XIII.	12. Matthias.	52. Dutch Admiral Van Tromp.
	25. Charles I.	27. Siege of Rochelle.	18. Thirty y'rs war.	
	49. Commonwealth. Oliver Cromwell.	43. Louis XIV.	19. Ferdinand II.	83. John Sobieski, king of Poland, defeats the Turks at Vienna.
	60. Stuarts restored. Charles II.	48. Wars of the Fronde.	20. Battle of Prague.	
	79. Habeas Corpus act.	72. Holland invaded.	30. Invasion of Gustavus Adolphus of Sweden.	89. Peter the Great, Russia.
	85. James II.	85. Edict of Nantes revoked.	32. Battle of Lutzen.	
	88. William and Mary.		37. Ferdinand III.	97. Charles XII. Sweden.
	90. Battle of the Boyne.		59. Leopold I.	
1700	2. Anne.	15. Louis XV.	5. Joseph I.	1. War of Spanish succession.
	14. House of Hanover. George I.	45. Battle of Fontenoy.	11. Charles VI.	9. Battle of Pultowa, defeat of Charles XII.
	27. George II.	74. Louis XVI.	40. Char's VII. War of the Austrian succession.	25. Catherine I. of Russia.
	39. War with Spain.	89. States General.	45. House of Lorraine. Francis I.	40. Frederick II. of Prussia.
	46. Stuart troubles in Scotland. Battle of Culloden.	90. Revolution.	65. Joseph II.	60. Capture of Berlin.
	56. War with France.	93. Louis XVI. beheaded. Republic.	90. Leopold II.	62. Catherine II. of Russia.
	60. George III.	99. Napoleon First Consul.	92. Francis II.	95. Partition of Poland. Prussia enlarged.
	75. War with American Colonies.		93. Rhenish Provinces revolt.	
			95. War with France.	

1800

**ENGLAND.**

1. Union with Ireland.
3. War with France.
5. Battle of Trafalgar.
8. Peninsular war.
12. War with United States.
15. Battle of Waterloo.

**FRANCE.**

4. Napoleon emperor.
5. Battle of Austerlitz.
6. Of Jena.
9. Of Wagram.
12. Russian campaign.
13. War with all Europe.
14. Allies enter France. Napoleon sent to Elba.
15. Napoleon returns. Battle of Waterloo. Napoleon sent to St. Helena.

**GERMANY.**

5. Kingdoms. Bavaria, Westphalia and Wurtemberg established.
6. Prussians at war with France. French enter Berlin.
10. France annexes N<sup>th</sup> Germany.
13. French evacuate Berlin.
14. Prussians occupy Paris.
15. Germanic confederation formed.

**ELSEWHERE.**

1. Alexander I. Russia.
5. Russia joins the coalition against France.
12. French invade Russia. Moscow burnt.
15. Holy Alliance between Russia, Prussia and Austria.

**FROM NAPOLEON TO THE PRESENT TIME.****ENGLAND.**

20. George IV.
30. William IV.
37. Victoria.
39. War with China.
48. Trouble in Ireland.
53. Crimean war.
56. War with Persia.
57. Indian mutiny.
67. War with Abyssinia.
73. Ashantee war.
78. War in Afghanistan.
79. Zula war.

**FRANCE.**

24. Charles X.
30. Conquest Algiers. Louis Phillipe.
48. Revolution. Republic.
51. Coup d'état.
52. Napoleon III. emperor.
59. War with Austria. Battles of Magenta and Solferino.
70. War with Prussia. Battle of Sedan.

**PRUSSIA.**

40. Frederick William IV. king.
48. Insurrection in Berlin.
61. William I.
64. War with Denmark.
66. War with Austria. Battle of Sadowa.
70. Invasion of France.
71. German Empire re-established. William I. emperor.

**ELSEWHERE**

27. Greece independent.
48. Hungarian war. Francis Joseph emperor of Austria.
54. Siege of Sebastopol.
55. Alexander II., Russia.
61. Victor Emanuel king of Italy.
68. Revolution in Spain.
70. A madeus king of Spain.
71. Rome capital of Italy.



1800

ENGLAND.	FRANCE.	GERMANY.	ELSEWHERE.
80. Famine in Ireland.	70. Surrender of Napoleon.	88. Death of William I.	75. Alphonso VII., Spain.
Land League.	71. Outbreak of the Commune.	Accession and death of Frederick III.	77. Russo-Turkish war.
82. War in Egypt.	Paris taken by storm.	William II.	79. Humbert king of Italy.
88. Irish home rule discussions.	Republic. Thiers president.	89. Mining strikes.	81. Alexander II. of Russia assassinated.
U. S. Government dismiss Lord Sackville, British minister.	73. MacMahon president.		Alexander III.
	79. Jules Grevy president.		
	87. Sadi-Carnot president.		
	89. Boulanger excitement.		

*Norfolk.* So fare you well, my little good Cardinal Wolsey.  
*Wolsey.* So fare you well to the little good you bare me.  
 Farewell, a long farewell to all my greatness!  
 This is the state of man: to-day he puts forth  
 The tender leaves of hopes, to-morrow blossoms,  
 And bears his blushing honors thick upon him:  
 And the third day comes a frost, a killing frost;  
 And—when he thinks, good easy man, full surely  
 His greatness is a ripening—nips his root  
 And then he falls as I do. I have ventured,  
 Like little wanton boys that swim on bladders,  
 This many summers in a sea of glory,  
 But far beyond my depth: my high-blown pride  
 At length broke under me, and now has left me  
 Weary and old with service, to the mercy  
 Of a rude stream that must forever hide me.  
 Vain pomp and glory of this world, I hate ye!

*Shakespeare, Henry VIII., Act III., Scene 2.*

(XL)

## AMERICA

A. D.

985	Icelandic discovery.
1492	Christopher Columbus discovers America.
1497	Cabot discovers Newfoundland.
1498	The Cabots on the Atlantic coast
1499	Amerigo Vespucci's voyage.
1512	Florida discovered by Ponce de Leon.
1513	Balboa discovers the Pacific Ocean.
1521	Cortez conquers Mexico.
1528	Narvaez visits Florida.
1534	Cartier explores the St. Lawrence.
1544	De Soto discovers the Mississippi.
1565	St. Augustine in Florida founded.
1585	First settlement at Roanoke Island a failure.

## THE COLONIES.

1607	Settlement at Jamestown.....	Virginia.
14.	New Amsterdam settled by Dutch.....	New York.
20.	Puritans land at Plymouth Rock.....	Massachusetts.
27.	Swedes and Finns settlement.....	Delaware.
34.	Catholic settlement at St. Mary's.....	Maryland.
35.	Settlements at Hartford and Windsor....	Connecticut.
36.	Roger Williams settles.....	Rhode Island.
64.	Elizabethtown settled.....	New Jersey.
65.	Clarendon colony settlement.....	North Carolina.
70.	Carteret colony found old Charleston....	South Carolina.
82.	William Penn .....	Pennsylvania.
1733	Oglethorpe founds Savannah.....	Georgia.
41.	Separated from Massachusetts.....	New Hampshire.

- 55. Braddock's defeat.
- 58. Fort DuQuesne taken by Washington.
- 65. Colonial Congress at New York resists stamp act.
- 68. General Gates sent to Boston.
- 70. Boston massacre.
- 74. Congress meets in Philadelphia.
- 75. The Revolutionary War begins with battle of Lexington.  
Battle of Bunker Hill.
- 76. Declaration of Independence.
- 77. Battle of Princeton.  
Surrender of Burgoyne at Saratoga.
- 78. Battle of Monmouth.
- 81. Battle of Cowpens.  
Surrender of Cornwallis at Yorktown.
- 83. Treaty of peace.
- 87. Constitution adopted.
- 88. Constitution ratified by eleven States.

**THE UNITED STATES.**

- 89. George Washington president.  
John Adams vice-president.
- 90. Indian war in Ohio.
- 91. Vermont admitted.
- 92. Kentucky admitted.
- 94. Whiskey insurrection.
- 96. Tennessee admitted.
- 97. John Adams president.  
Thomas Jefferson vice-president.
- 99. Death of Washington.  
Washington City, D. C., the capital.

1800

- 1. Thomas Jefferson president.  
Aaron Burr vice-president.
- 2. Ohio admitted.

**SPANISH AND  
BRITISH AMERICA.**

- 3. Hayti Republic.
- 8. King of Portugal  
goes to Brazil.



Louisiana purchased from the French.  
War with Tripoli.

5. George Clinton vice-president.
7. Trial of Aaron Burr.
9. James Madison president.  
George Clinton vice-president.
11. Battle of Tippecanoe.
12. Louisiana admitted.  
War with England.  
Invasion of Canada.  
Surrender of Mackinaw.
13. Battle of Lake Erie.  
Com. Perry captures English fleet.  
Elbridge Gerry vice-president.  
Battle of the Thames.
14. Battle of Lundy's Lane.  
English capture Washington city and  
burn public buildings.  
Battle of North Point.  
Bombardment of Fort McHenry.
15. Battle of New Orleans.
16. Indiana admitted.
17. James Monroe president.  
Daniel Tompkins vice-president.  
Mississippi admitted.
18. Illinois admitted.  
Florida war.
19. Alabama admitted.  
Purchase of Florida.
20. Missouri Compromise.  
Maine admitted.
21. Missouri admitted.
23. Monroe doctrine declared.
24. Visit of Lafayette.

9. Buenos Ayres  
War of Independence.

11. Dr. Francia dic-  
tator of Para-  
guay.

15. Brazil made a  
kingdom.

16. Buenos Ayres  
independent.

17. Chili, after a hard  
struggle, inde-  
pendent.

21. Mexico indepen-  
dent.  
Spaniards driven  
out of Peru.

22. Brazil indepen-  
dent.  
Dom Pedro em-  
peror.  
Iturbide emperor  
of Mexico.  
United States ac-  
knowledge in-  
dependence of  
So'h American  
Republics.

24. Bolivar dictator  
of Peru.

25. Bolivia indepen-  
dent.

John Quincy Adams president.  
John C. Calhoun vice-president.

28. Protective tariff bill passed.

29. Andrew Jackson president.  
John C. Calhoun vice-president.

32. Veto United States Bank bill.  
Black Hawk war.

33. Martin Van Buren vice-president.  
Public funds withdrawn from United States Bank.

35. Seminole war.

36. Arkansas admitted.

37. Martin Van Buren president.  
Richard M. Johnson vice-president.  
Michigan admitted.  
Financial crisis, banks suspend, business failures and distress throughout the country.

40. Northeastern boundary line disputes.

41. William H. Harrison president.  
John Tyler vice-president.  
Harrison dies April 4th.  
John Tyler president.  
Veto of bank bill.

43. Dorr rebellion in Rhode Island.

44. Texas applies for annexation.

45. James K. Polk president.  
George M. Dallas vice-president.  
Texas annexed.  
Florida admitted.

46. Iowa admitted.  
War with Mexico. Battles of Palo Alto and Resaca de la Palma.

47. Buena Vista, Cerro Gordo and Contreras.  
Capture of city of Mexico.

48. Acquisition of New Mexico and California.  
Wisconsin admitted.

28. Uruguay independent.

29. Formation of United States of Colombia.

31. Dom Pedro abdicates, his six year old son, Dom Pedro II, emperor of Brazil.

32. Texans revolt.

33. Defeat of the Mexicans.

37. Insurrection in Canada.

45. War between U. S. and Mexico.

1849

Zachary Taylor president.  
Millard Fillmore vice-president.

50. President Taylor dies.  
Millard Fillmore president.  
California admitted.  
Fugitive slave law passed.

53. Franklin Pierce president.  
William Rufus King vice-president.  
Martin Kosta protection.

55. Commotions in Kansas.

57. James Buchanan president.  
John C. Breckinridge vice-president.  
Dred Scott decision.

58. Minnesota admitted.

59. Oregon admitted.

61. Kansas admitted.

61. Abraham Lincoln president.  
Hannibal Hamlin vice-pres't.  
Attack on Fort Sumter.  
Harper's Ferry and Norfolk seized.  
Battle of Bull Run.

62. Capture of Fort Donelson.  
Battle of Pea Ridge.  
Battle of Shiloh.  
Battle of Fair Oaks.  
Seven days' battles—Chickahominy.  
Battle of Cedar Mountain.  
Second battle of Bull Run.

63. Emancipation proclamation issued.  
West Virginia admitted.

# CONFEDERATE STATES.

61. South Carolina, Mississippi, Alabama, Florida, Georgia, Louisiana, Texas, Arkansas, Tennessee and N'th Carolina, secede:

Jefferson Davis president.

Virginia secedes.

62. Battles of Corinth, of Fredericksburg, of Murfreesboro.

63. Battle of Chancellorsville.

Siege of Vicksburg.

Battle of Gettysburg.

Battle of Chickamauga.

50. Lopez' attempt on Cuba.

51. Lopez garroted.

53. Santa Anna dictator of Mexico.

56. Walker's Nicaraguan expedition.

58. Juarez president of Mexico.

62. France at war with Mexico.

63. French enter city of Mexico.

Archduke Maximilian of Austria invited to become emperor.

64. He accepts.

(XV.)



1864

Battles of the Wilderness.

Nevada admitted.

65. Andrew Johnson vice-president.

President Lincoln shot, April 14th.

Andrew Johnson president.

Amnesty issued by the president.

Siege of Petersburg.

65. Battle of Five Forks.

Capture of Petersburg and Richmond.

Surrender of Lee, Johnston and Kirby Smith.

End of the war.

65. Paraguay at war with Uruguay, Brazil and Argentine Republic.

Spain and Chili at war.

66. Juarists in Mexico have great successes.

67. Surrender and execution of Maximilian.

69. Cuban revolt.

79 War between Chili and Peru.

89. Civil war in Hayti.

67. Nebraska admitted.

Alaska purchased.

68. Readmission of Southern States.

69. Ulysses S. Grant president. Schuyler Colfax vice-president.

72. Geneva award.

73. Henry Wilson vice-president. Modoc war.

76. Colorado admitted.

77. Rutherford B. Hayes president. William A. Wheeler vice-president. Railroad riots.

81. James A. Garfield president. Chester A. Arthur vice-president. President Garfield shot by Guiteau. Chester A. Arthur president.

85. Grover Cleveland president. Thomas A. Hendricks vice-president.

86. Anarchist riot, Chicago.

88. Lord Sackville, British minister, dismissed.

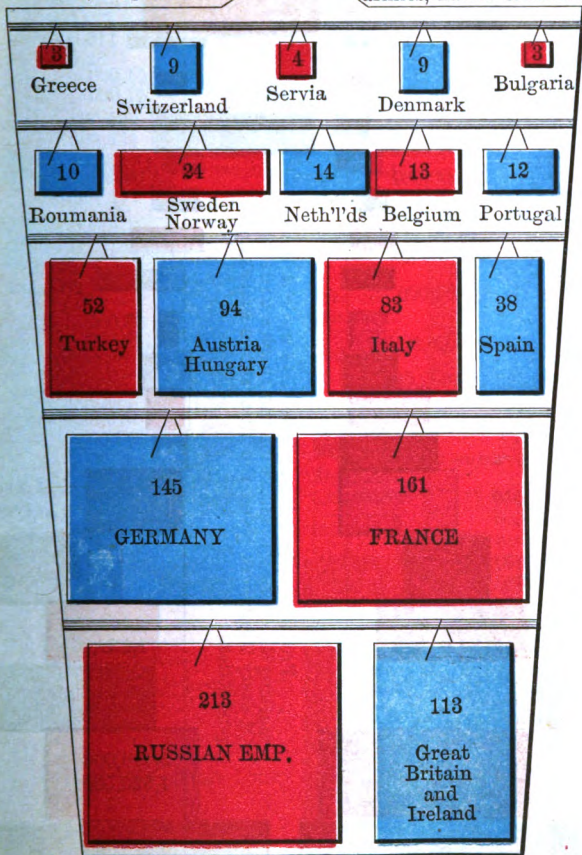
89. Benjamin W. Harrison president. Levi P. Morton vice-president. North and South Dakota, Washington and Montana admitted to the Union.

# European

# Balance of Power.

Proportionate Strength  
1,000 parts.

Deduced from tables  
of population, wealth, debts,  
armies, navies & railroads.



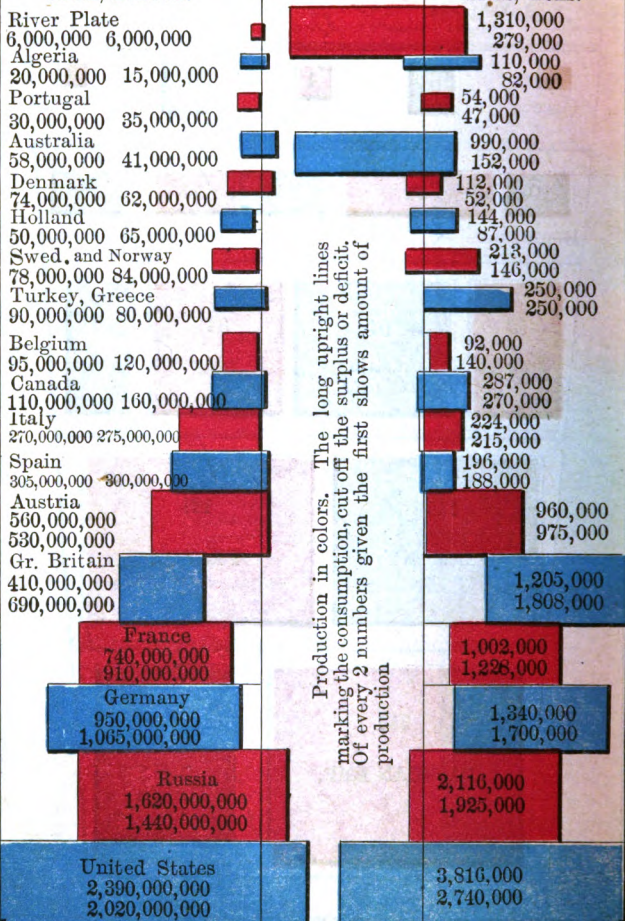
# The World's Food Supply.

Average yearly Production and Consumption.

From Mulhall's estimates.

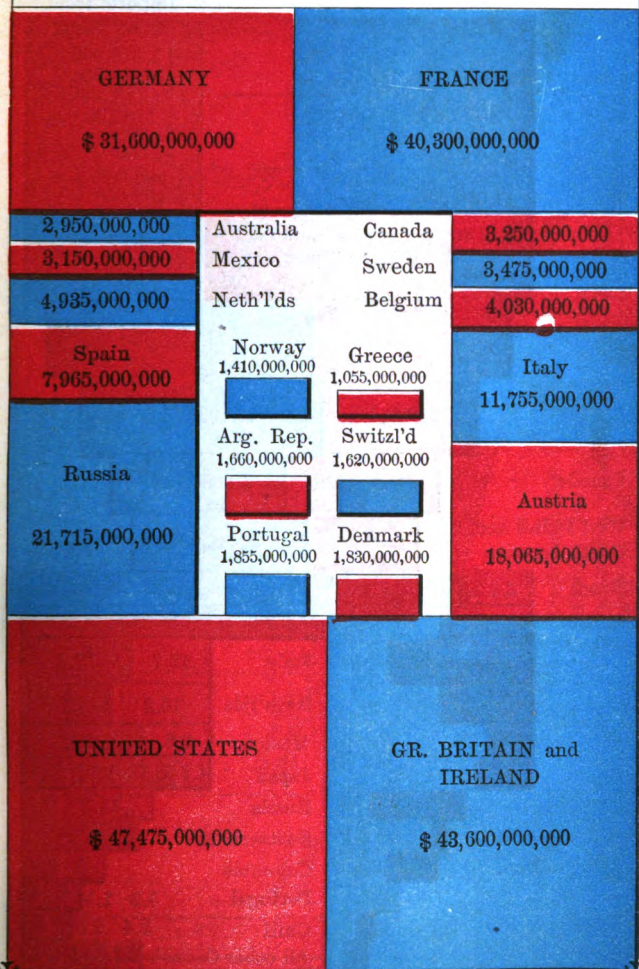
Grain, Bushels.

Meat, Tons.





# Wealth of Nations.



# Our Foreign Trade.

Exports to.

(1888.)

Imports from.

Great Britain

\$ 364,210,116

\$ 180,136,570

In the small blocks below the figures stand for millions.

Germany

56,414,171

78,421,835

France

42,200,446

72,109,816

Canada

37,245,119

43,084,123

West Indies and Cent'l America

25.2

42,842,097

Brazil

7.1

53,710,234

Cuba

10.

49,319,087

Belgium

25,180,722

9.8

Italy

12.7

18.4

Spain

14.6

15.5

Neth'l'ds

16.2

12.3

East Ind.

6.1

21.7

Mexico

9.8

17.2

China

7.0

17.8

Japan

4.2

18.6

Australia

11.1

5

Russia

11.3

3.5

Hawaii Isl'ds

3

11

Switzerland

13.7

Argent. Rep.

6.6

5.9

Colombia

5

4.3

Austria

8.6

Portugal

5.2

1.5

Sweden & Nor.

2.7

3.2

Chili

2.4

2.8

Denmark

3.6

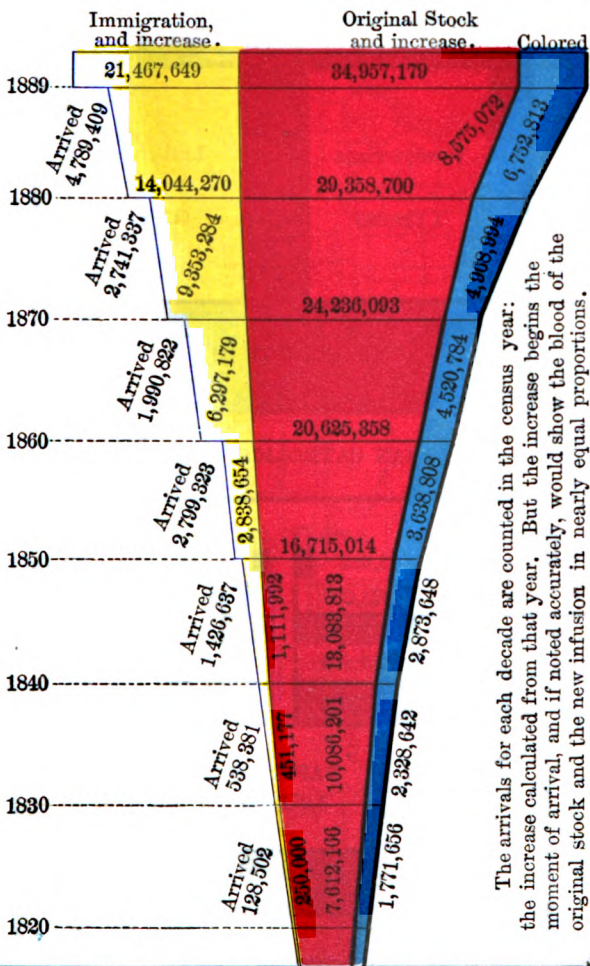
1

All other Count's

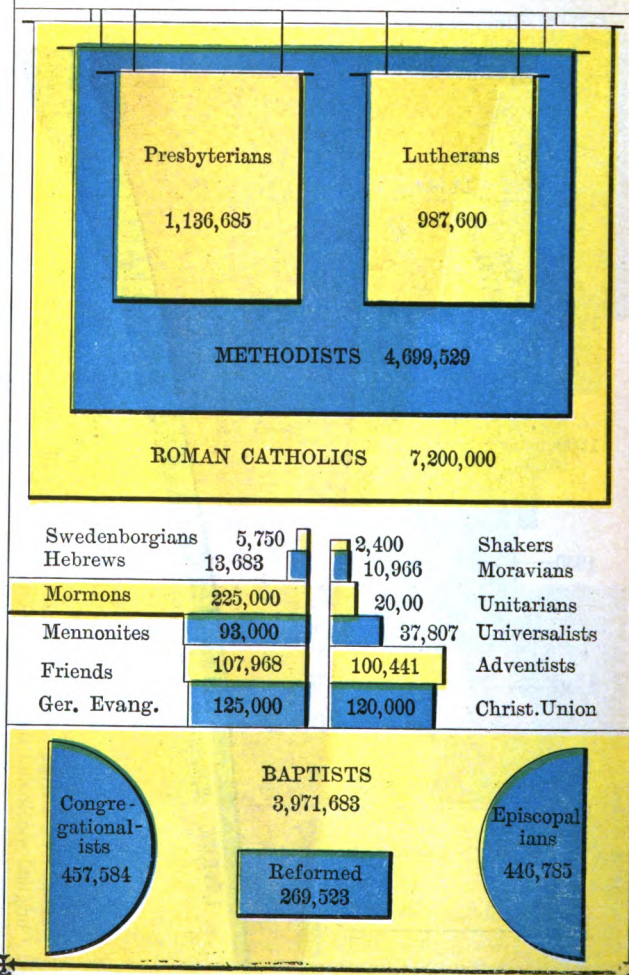
3.7

9.8

# Growth of U. S. Population since 1820.

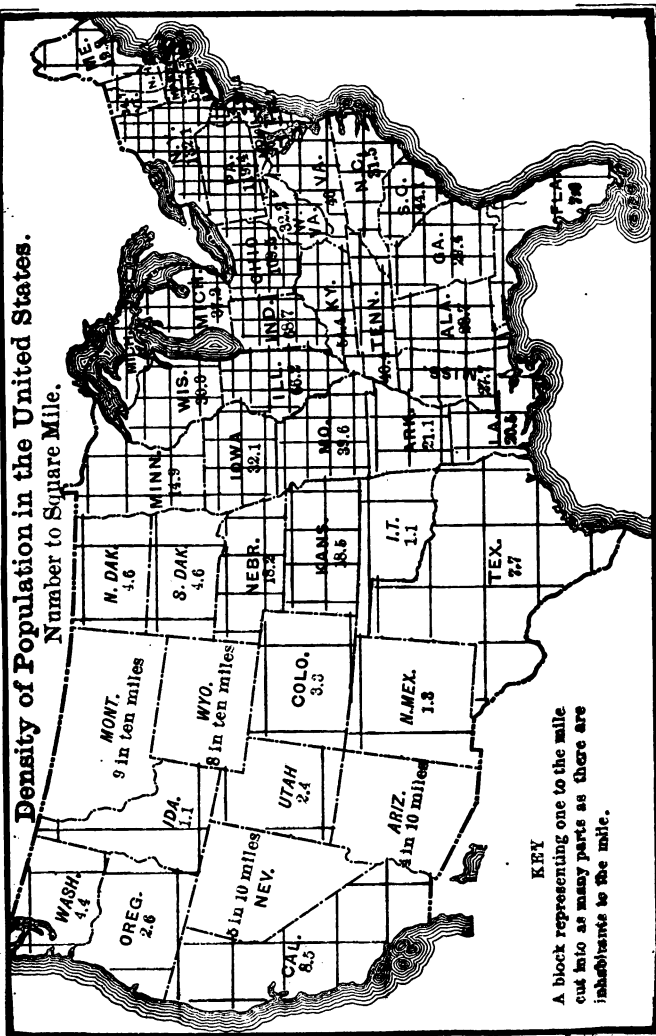


# Religion in the United States.





# Density of Population in the United States. Number to Square Mile.

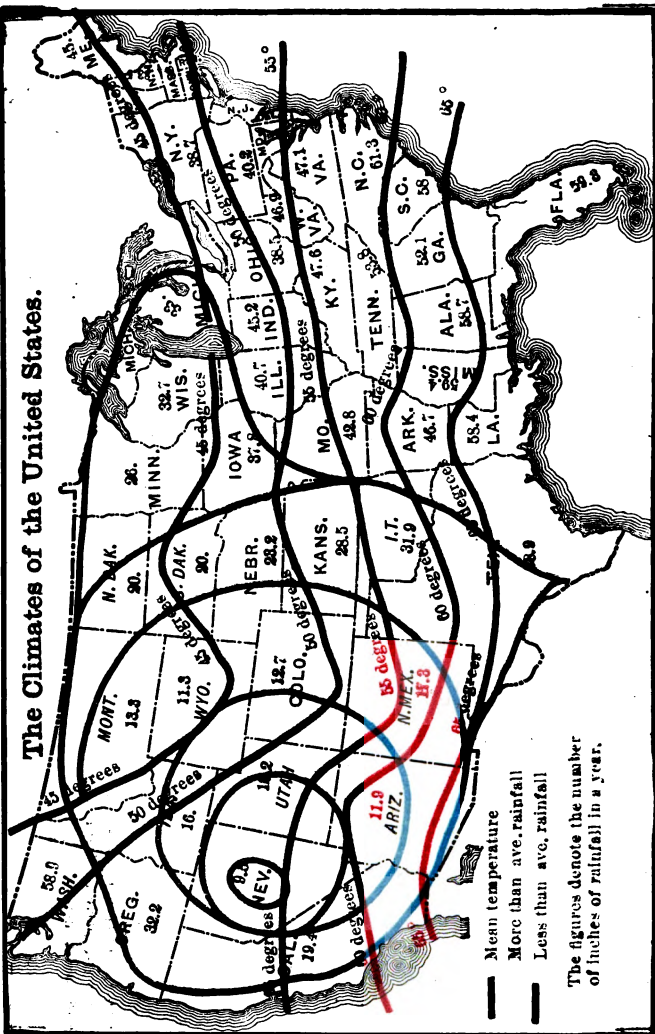


## KEY

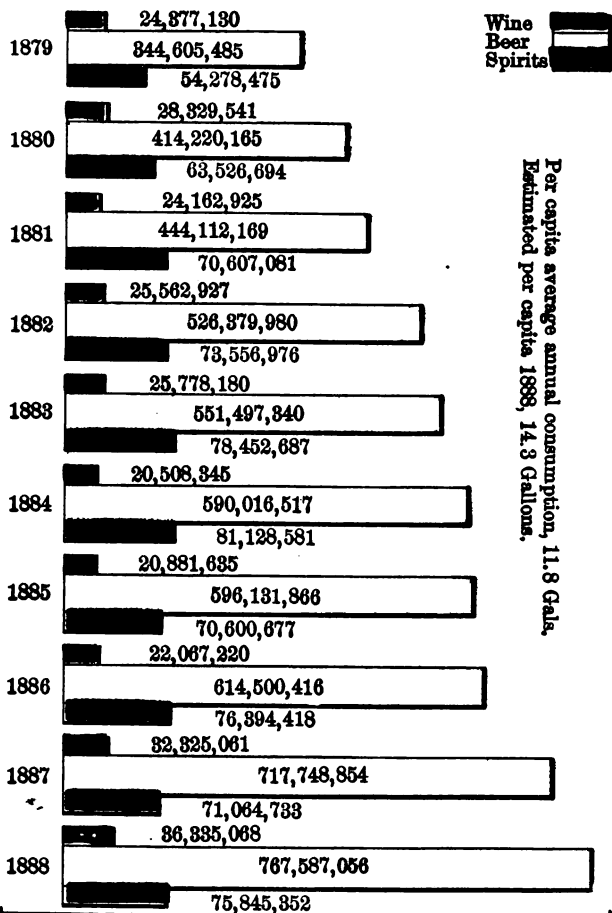
A block representing one to the mille cut into as many parts as there are inhabitants to the mille.



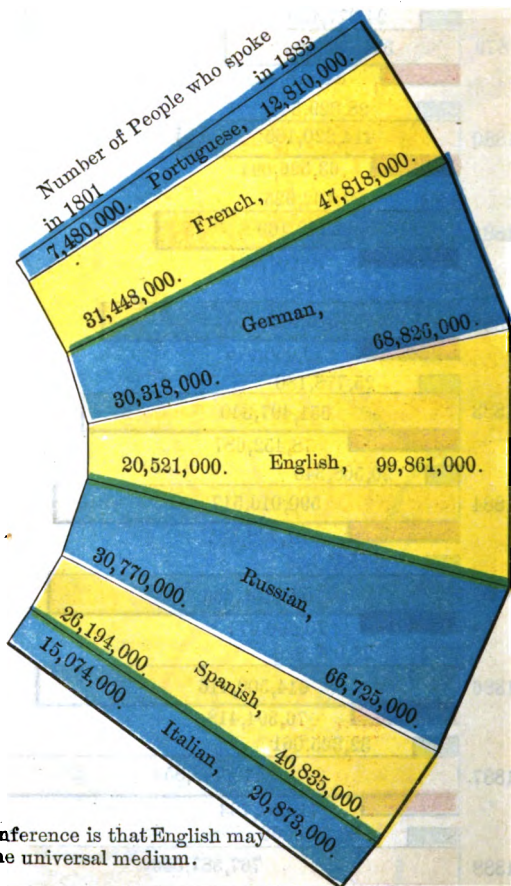
# The Climates of the United States.



# Consumption of Wines, Malt Liquors, and Distilled Spirits In the United States—Gallons.



# **Comparative Growth of Seven Languages during Eighty-two Years.**



A fair inference is that English may become the universal medium.

## *Pensions paid since 1865.*

In Twenty-five years the United States Government  
has expended \$1,049,046,886 in pensions.

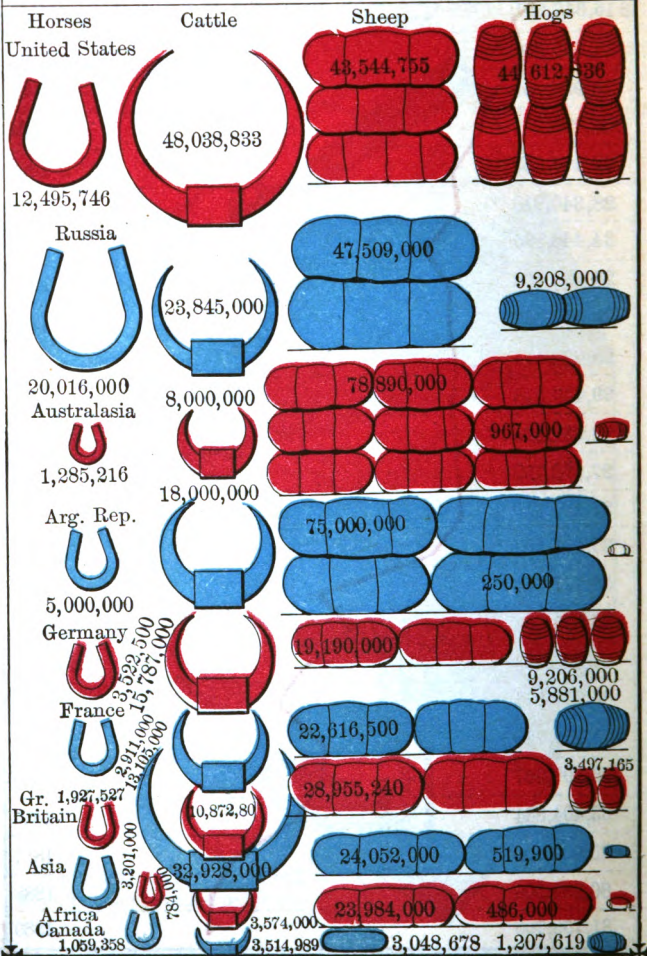
\$ 16,347,624	A.D. 1865
15,605,556	1866
20,936,652	1867
23,782,387	1868
23,476,622	1869
23,340,210	1870
34,443,895	1871
28,583,403	1872
29,859,427	1873
29,038,415	1874
29,456,210	1875
28,257,896	1876
27,963,752	1877
27,137,019	1878
35,121,482	1879
56,777,174	1880
60,659,280	1881
61,345,194	1882
66,012,574	1883
55,429,228	1884
56,102,267	1885
63,404,864	1886
75,029,102	1887
80,288,504	1888
81,758,700	1889

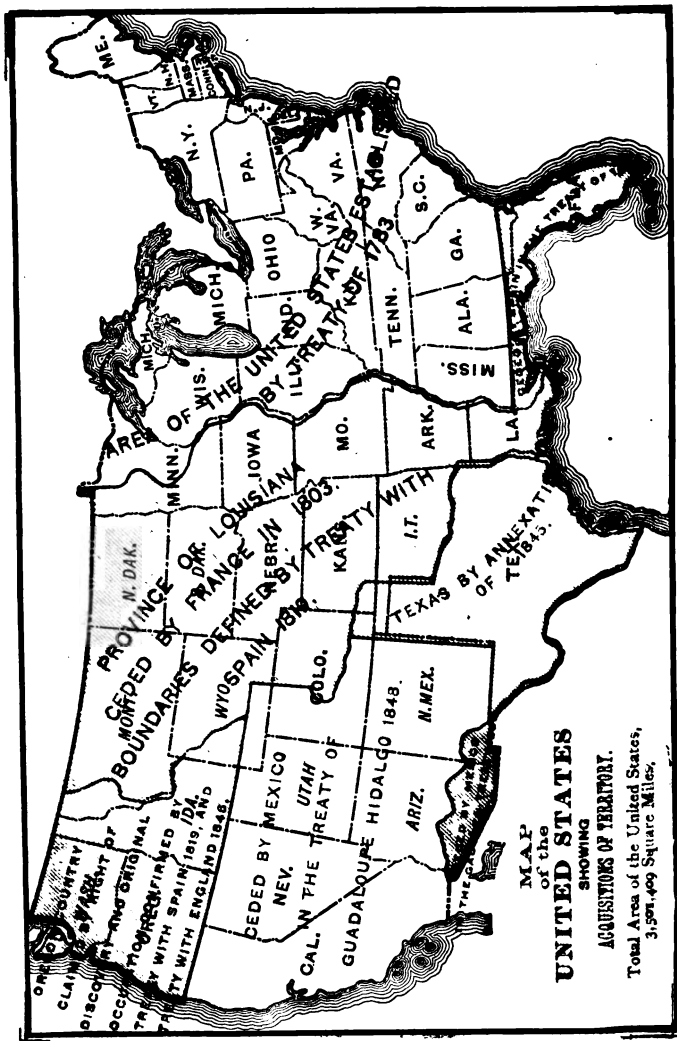
In 1868 the pensions took .06 of total  
receipts. In 1878 .10 In 1888 .20

The amount for 1880 is the  
congressional appropriation,  
not actual disbursement.

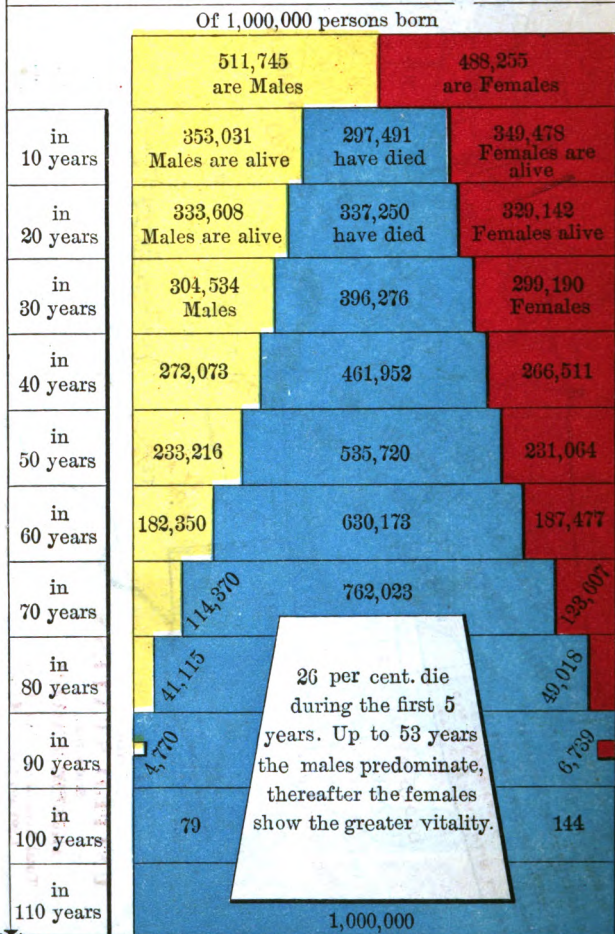
# Farm Animals.

From Statistics of the Agricultural Dep'tmt.





## *Duration of Life.*



## INTERESTING FACTS OF SCIENCE AND STATISTICS.

A HAWK flies 150 miles per hour; an eider duck, 90 miles; a pigeon, 40 miles.

A MAN's working life is divided into four decades; 20 to 30, bronze; 30 to 40, silver; 40 to 50, gold; 50 to 60, iron. Intellect and judgment are strongest between 40 and 50.

HAIR which is lightest in color is also lightest in weight. Light or blonde hair is generally the most luxuriant, and it has been calculated that the average number of hairs of this color on an average person's head is 140,000; while the number of brown hairs is 110,000, and black only 103,000.

GOLDSMITH received \$300 for the "Vicar of Wakefield;" Moore, \$15,500 for "Lalla Rookh;" Victor Hugo, \$12,000 for "Hernani;" Chateaubriand, \$110,000 for his works; Lamartine, \$16,000 for "Travels in Palestine;" Disraeli, \$50,000 for "Endymion;" Anthony Trollope, \$315,000 for forty-five novels; Lingard, \$21,500 for his "History of England;" Mrs. Grant received over \$600,000 as royalty from the sale of "The Personal Memoirs of U. S. Grant."

ONE woman in 20, one man in 30 is barren—about 4 per cent. It is found that one marriage in 20 is barren—5 per cent. Among the nobility of Great Britain, 21 per cent. have no children, owing partly to intermarriage of cousins, no less than  $4\frac{1}{2}$  per cent. being married to cousins.

THE capital employed in banking in the principal countries is as follows: Great Britain, \$4,020,000,000; United States, \$2,655,000,000; Germany, \$1,425,000,000; France, \$1,025,000,000; Austria, \$830,000,000; Russia, \$775,000,000; Italy, \$455,000,000; Australia, \$425,000,000; Canada, \$175,000,000.

THE largest bells are the following, and their weight is given in tons: Moscow, 202; Burmah, 117; Peking, 53; Novgorod, 31; Notre Dame, 18; Rouen, 18; Olmutz, 18; Vienna, 18; St. Paul's, 16; Westminster, 14; Montreal, 12; Cologne, 11; Oxford, 8; St. Peter's, 8.

Bell-metal should have 77 parts copper, and 23 tin.

AMERICAN life average for professions (Boston): Storekeepers, 41.8 years; teamsters, 43.6 years; laborers, 44.6 years; seamen, 46.1 years; mechanics, 47.3 years; merchants, 48.4 years; lawyers, 52.6 years; farmers, 64.2 years.

IN THE SMALL-POX epidemic of 1881, in England, the returns showed 4,478 deaths per million inhabitants—98 vaccinated to 4,380 unvaccinated, or in the proportion of 44 to 1. In the epidemic at Leipsic in 1871, the death rate was 12,700 per million, 70 per cent. of whom were unvaccinated. These figures are by Dr. Mulhall. In Boston the proportion was 15 to 50, and in Philadelphia, 17 to 64.



## FACTS OF SCIENCE AND STATISTICS.

During the Franco-German war the Germans lost only 263 men from this disease, the French 23,499, the former having been revaccinated in barracks. In the war in Paraguay, the Brazilians lost 43,000 men from malignant or black small-pox, that is, 35 per cent. of their army, nine cases in ten proving fatal.

A CAMEL has twice the carrying power of an ox; with an ordinary load of 400 lbs. he can travel 12 to 14 days without water, going 40 miles a day. Camels are fit to work at 5 years old, but their strength begins to decline at 25, although they live usually till 40.

THE CHECKS paid in New York and London in one month aggregate \$6,350,000,000, which is greatly in excess of the value of all the gold and silver coin in existence.

POUNDS of water evaporated by 1 lb. of fuel as follows: Straw, 1.9; wood, 3.1; peat, 3.8; coke or charcoal, 6.4; coal, 7.9; petroleum, 14.6.

IN 1877 the newspaper *Nationale* of Paris had ten pigeons which carried dispatches daily between Versailles and Paris in fifteen to twenty minutes. In November, 1882, some pigeons, in face of a strong wind, made the distance of 160 miles, from Canton Vaud to Paris, in  $6\frac{1}{2}$  hours, or 25 miles per hour.

THE average elevation of continents above sea level is: Europe, 670 feet; Asia, 1,140 feet; North America, 1,150 feet; South America, 1,100 feet.

IN 1684, four men were taken alive out of a mine in England, after 24 days without food. In 1880, Dr. Tanner, in New York, lived on water for 40 days, losing 36 lbs. in weight.

THE fair of Nijni-Novgorod is the greatest in the world, the value of goods sold being as follows: 1841, \$35,000,000; 1857, \$60,000,000; 1876, \$140,000,000; the attendance in the last named year including 150,000 merchants from all parts of the world. In that of Leipsic the annual average of sales is \$20,000,000, comprising 20,000 tons of merchandise, of which two-fifths is books.

THE average annual production of flax is as follows: Russia, 270,000 tons; Austria, 53,000; Germany, 48,000; Belgium and Holland, 38,000; France, 37,000; United Kingdom, 25,000; Italy, 23,000; United States, 12,000; Scandinavia, 4,000—total, 510,000 tons.

A BODY weighing 140 lbs. produces 3 lbs. ashes; time for burning, 55 minutes.

THE six largest diamonds in the world weigh, respectively, as follows: Kohinoor, 103 carats; Star of Brazil, 125 carats; Regent of France, 136 carats; Austrian Kaiser, 139 carats; Russian Czar, 193 carats; Rajah of Borneo, 367 carats. The value of the above is not regulated by size, nor easy to estimate, but none of them is worth less than \$500,000. [226]

## FACTS OF SCIENCE AND STATISTICS.

ACCORDING to Orfila, the proportion of nicotine in Havana tobacco is 2 per cent.; in French, 6 per cent., and in Virginia tobacco, 7 per cent. That in Brazilian is still higher.

THERE were 2,180 lepers in Norway in 1883, according to Mulhall. The numbers in Spain and Italy are considerable. In the Sandwich Islands the disease is so prevalent that the island of Molokai is set apart for lepers, who are under the direction of a French Jesuit priest. The death of Father Damien, in 1889, called attention to the noblest instance of self-sacrifice recorded in the nineteenth century. His place is now filled by a younger member of his order, who voluntarily sacrifices his health and life to aid the outcasts. In the Seychelles Islands leprosy is also common.

ONE horse-power will raise 10 tons per minute a height of 12 inches, working 8 hours a day. This is about 5,000 foot-tons daily, or 12 times a man's work.

THE horse-power of Niagara is  $3\frac{1}{4}$  million nominal, equal to 10 million horses effective.

GOOD clear ice two inches thick will bear men to walk on; four inches thick will bear horses and riders; six inches thick will bear horses and teams with moderate loads.

THE percentage of illegitimate births for various countries, as stated by Mulhall, is as follows: Austria, 12.9; Denmark, 11.2; Sweden, 10.2; Scotland, 8.9; Norway, 8.05; Germany, 8.04; France, 7.02; Belgium, 7.0; United States, 7.0; Italy, 6.8; Spain and Portugal, 5.5; Canada, 5.0; Switzerland, 4.6; Holland, 3.5; Russia, 3.1; Ireland, 2.3; Greece, 1.6.

INDIA RUBBER is obtained mostly from the Seringueros of the Amazon, who sell it for about 12 cents a pound to the merchants of Para, but its value on reaching England or the United States is over 50 cents a pound. The best rubber forests in Brazil will ultimately be exhausted, owing to the reckless mode followed by the Seringueros, or tappers. The ordinary product of a tapper's work is from 10 to 16 lbs. daily. There are 120 india rubber manufacturers in the United States, employing 15,000 operatives, who produce 280,000 tons of goods, valued at \$260,000,000 per annum.

ONE pair of rabbits can become multiplied in four years into 1,250,000. They were introduced in Australia a few years ago, and now that colony ships 6,000,000 rabbit skins yearly to England.

THE largest of the Pyramids, that of Cheops, is composed of four million tons of stone, and occupied 100,000 men during 20 years, equal to an outlay of \$200,000,000. It would now cost \$20,000,000 at a contract price of 36 cents per cubic foot.

ONE tug on the Mississippi can take, in six days, from St.

## FACTS OF SCIENCE AND STATISTICS.

Louis to New Orleans, barges carrying 10,000 tons of grain, which would require 70 railway trains of fifteen cars each. Tugs in the Suez Canal tow a vessel from sea to sea in 44 hours.

COMPARATIVE SCALE OF STRENGTH.—Ordinary man, 100; Byron's Gladiator, 173; Farnese Hercules, 362; Horse, 750.

A MAN will die for want of air in five minutes; for want of sleep, in ten days; for want of water, in a week; for want of food, at varying intervals, dependent on various circumstances.

THE average of human life is 33 years. One child out of every four dies before the age of 7 years, and only one-half of the world's population reach the age of 17. One out of 10,000 reaches 100 years. The average number of births per day is about 120,000, exceeding the deaths by about 15 per minute. There have been many alleged cases of longevity in all ages, but only a few are authentic.

THE ratio of sickness rises and falls regularly with death rate in all countries, as shown by Dr. Farr and Mr. Edmonds at the London Congress of 1860, when the following rule was established: Of 1,000 persons, aged 30, it is probable 10 will die in the year, in which case there will be 20 of that age sick throughout the year, and 10 invalids. Of 1,000 persons, aged 75, it is probable that 100 will die in the year, in which case the sick and invalids of that age will be 300 throughout the year. For every 100 deaths let there be hospital beds for 200 sick, and infirmaries for 100 invalids.

THE estimated number of religious denominations among English-speaking communities throughout the world is as follows: Episcopalians, 21,100,000; Methodists of all descriptions, 15,800,000; Roman Catholics, 14,340,000; Presbyterians of all descriptions, 10,500,000; Baptists of all descriptions, 8,160,000; Congregationalists, 6,000,000; Unitarians, 1,000,000; Free Thought, 1,100,000; minor religious sects, 2,000,000; of no particular religion, 20,000,000. Total English speaking population, 100,000,000.

THE various nations of Europe are represented in the list of Popes as follows: English, 1; Dutch, 1; Swiss, 1; Portuguese, 1; African, 2; Austrian, 2; Spanish, 5; German, 6; Syrian, 8; Greek, 14; French, 15; Italian, 197. Eleven Popes reigned over 20 years; 69, from 10 to 20; 57, from 5 to 10; and the reign of 116 was less than 5 years. The reign of Pius IX. was the longest of all, the only one exceeding 25 years. Pope Leo XIII. is the 258th Pontiff. The full number of the Sacred College is 70, namely: Cardinal Bishops, 6; Cardinal Priests, 50; Cardinal Deacons, 14. At present there are 62 Cardinals. The Roman Catholic hierarchy throughout the world, according to official

## FACTS OF SCIENCE AND STATISTICS.

returns published at Rome in 1884, consisted of 11 Patriarchs, and 1,153 Archbishops and Bishops. Including 12 coadjutor or auxiliary bishops, the number of Roman Catholic archbishops and bishops now holding office in the British Empire is 134. The numbers of the clergy are approximate only.

CONSUMPTION.—Of the total number of deaths the percentage traceable to consumption in the several States and Territories is as follows: Alabama, 9.6; Arizona, 6.1; Arkansas, 6.4; California, 15.6; Colorado, 8.2; Connecticut, 15.1; Dakota, 8.8; Delaware, 16.1; District of Columbia, 18.9; Florida, 8.3; Georgia, 7.9; Idaho, 6.8; Illinois, 10.3; Indiana, 12.6; Iowa, 9.9; Kansas, 7.3; Kentucky, 15.7; Louisiana, 10.4; Maine, 19.2; Maryland, 14.0; Massachusetts, 15.7; Michigan, 13.2; Minnesota, 9.3; Mississippi, 8.8; Missouri, 9.8; Montana, 5.6; Nebraska, 8.8; Nevada, 6.3; New Hampshire, 5.6; New Jersey, 8.9; New Mexico, 2.4; New York, 8.1; North Carolina, 9.5; Ohio, 13.8; Oregon, 12.1; Pennsylvania, 12.6; Rhode Island, 14.6; South Carolina, 9.8; Tennessee, 14.5; Texas, 6.5; Utah, 2.8; Vermont, 16.1; Virginia, 12.2; Washington, 13.2; West Virginia, 13.0; Wisconsin, 10.4; Wyoming, 2.6; Average, 12.0.

CAPACITY of the largest public buildings in the world: Coliseum, Rome, 87,000; St. Peter's, Rome, 54,000; Theater of Pompey, Rome, 40,000; Cathedral, Milan, 37,000; St. Paul's, Rome, 32,000; St. Paul's, London, 31,000; St. Petronia, Bologna, 26,000; Cathedral, Florence, 24,300; Cathedral, Antwerp, 24,000; St. John Lateran, Rome, 23,000; St. Sophia's, Constantinople, 23,000; Notre Dame, Paris, 21,500; Theater of Marcellus, Rome, 20,000; Cathedral, Pisa, 13,000; St. Stephen's, Vienna, 12,400; St. Dominic's, Bologna, 12,000; St. Peter's, Bologna, 11,400; Cathedral, Vienna, 11,000; Gilmore's Garden, New York, 8,443; La Scala, Milan, 8,000; Auditorium, Chicago, 7,000; Mormon Temple, Salt Lake City, 8,000; St. Mark's, Venice, 7,500; Spurgeon's Tabernacle, London, 6,000; Bolshoi Theater, St. Petersburg, 5,000; Tabernacle (Talmage's), Brooklyn, 5,000; Music Hall, Cincinnati, 4,824.

THERE are 3,000,000 opium smokers in China. A paper read before the New York Medical Society by Dr. F. N. Hammond presents some important facts. In 1840 about 20,000 pounds of opium were consumed in the United States; in 1880, 533,450 pounds. In 1868 there were about 90,000 habitual opium-eaters in the country, now they number over 500,000. More women than men are addicted to the use of the drug. The vice is one so easily contracted, so easily practiced in private, and so difficult of detection, that it presents peculiar temptations and is very insidious. The relief from pain that it gives and the peculiar exaltation of spirits easily lead the victim to believe that the use

## FACTS OF SCIENCE AND STATISTICS.

of it is beneficial. Opium and chloral are today the most deadly foes of women. Dr. Hammond is the better qualified to speak on this subject from having once been a consumer of opium himself. To break off from the habit, he says, the opium-eater must reduce the quantity of his daily dose, using at the same time other stimulants, and gradually eliminate the deadly drug entirely.

THE degrees of alcohol in wines and liquors are: Beer, 4.0; porter, 4.5; ale, 7.4; cider, 8.6; Moselle, 9.6; Tokay, 10.2; Rhine, 11.0; Orange, 11.2; Bordeaux, 11.5; hock, 11.6; gooseberry, 11.8; Champagne, 12.2; claret, 13.3; Burgundy, 13.6; Malaga, 17.3; Lisbon, 18.5; Canary, 18.8; sherry, 19.0; Vermouth, 19.0; Cape, 19.2; Malmsey, 19.7; Marsala, 20.2; Madeira, 21.0; port, 23.2; Curaçoa, 27.0; aniseed, 33.0; Maraschino, 34.0; Chartreuse, 43.0; gin, 51.6; brandy, 53.4; rum, 53.7; Irish whisky, 53.9; Scotch, 54.3.

Spirits are said to be "proof" when they contain 57 per cent. The maximum amount of alcohol, says Parkes, that a man can take daily without injury to his health is that contained in 2 oz. brandy,  $\frac{1}{4}$  pt. of sherry,  $\frac{1}{2}$  pt. of claret, or 1 pt. of beer.

THE measurement of that part of the skull which holds the brain is stated in cubic inches thus: Anglo-Saxon, 105; German, 105; Negro, 96; Ancient Egyptian, 93; Hottentot, 58; Australian native, 58. In all races the male brain is about ten per cent. heavier than the female. The highest class of apes has only 16 oz. of brain. A man's brain, it is estimated, consists of 300,000,000 nerve cells, of which over 3,000 are disintegrated and destroyed every minute. Every one, therefore, has a new brain once in sixty days. But excessive labor, or the lack of sleep, prevents the repair of the tissues, and the brain gradually wastes away. Diversity of occupation, by calling upon different portions of the mind or body, successfully affords, in some measure, the requisite repose to each. But in this age of overwork there is no safety except in that perfect rest which is the only natural restorative of exhausted power. It has been noticed by observant physicians in their European travels that the German people, who, as a rule, have little ambition and no hope to rise above their inherited station, are peculiarly free from nervous diseases; but in America, where the struggle for advancement is sharp and incessant, and there is nothing that will stop an American but death, the period of life is usually shortened five, ten or twenty years by the effects of nervous exhaustion. After the age of 50 the brain loses an ounce every ten years. Cuvier's weighed 64, Byron's 79, and Cromwell's 90 ounces, but the last was diseased. Post-mortem examinations in France give an average of 55 to 60 ounces for the brains of the worst class of criminals.

## FACTS OF SCIENCE AND STATISTICS.

IN the cholera visitation of 1866, the proportion of deaths per 10,000 inhabitants in the principal cities of Europe was as follows: London, 18; Dublin, 41; Vienna, 51; Marseilles, 64; Paris, 66; Berlin, 83; Naples, 89; St. Petersburg, 98; Madrid, 102; Brussels, 184; Palermo, 197; Constantinople, 738.

THERE were 48,930 blind people in the United States in 1880, and 33,880 deaf mutes.

It is estimated that the number of insane persons in the United States is 168,900. *Causes of Insanity*.—Hereditary, 24 per cent.; drink, 14 per cent.; business, 12 per cent.; loss of friends, 11 per cent.; sickness, 10 per cent.; various, 29 per cent. This result is the medium average arrived at by Mulhall on comparing the returns for the United States, England, France and Denmark.

NO FEWER than 1,326 editions of the Bible were published in the sixteenth century. In the seventeenth and eighteenth centuries it was translated and published in many languages by the polyglot press of Propaganda Fide at Rome. In the nineteenth century the English and American societies have printed, in the Protestant version, 124,000,000 copies of the Bible or of the New Testament, viz: British, 74,000,000; American, 32,000,000; other societies, 15,000,000 copies.

THE King James version of the Bible contains 3,566,480 letters, 773,746 words, 31,173 verses, 1,189 chapters, and 66 books. The word *and* occurs 46,277 times. The word *Lord* occurs 1,855 times. The word *Reverend* occurs but once, which is in the 9th verse of the 111th Psalm. The middle verse is the 8th verse of the 118th Psalm. The 21st verse of the 7th chapter of Ezra contains all the letters of the alphabet except the letter J. The 19th chapter of II Kings and the 37th chapter of Isaiah are alike. The longest verse is the 9th verse of the 8th chapter of Esther. The shortest verse is the 35th verse of the 11th chapter of St. John. There are no words or names of more than six syllables.

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### Some of Nature's Wonders.

The human body has 240 bones.

The musical scale was invented in 1022.

Man's heart beats 92,160 times in a day.

A salmon has been known to produce 10,000,000 eggs. Some female spiders produce 2,000 eggs. A queen bee produces 100,000 eggs in a season.

There are 9,000 cells in a square foot of honeycomb.

It requires 2,300 silk worms to produce one pound of silk.

It would take 27,600 spiders to produce one pound of web.

## LEGAL ADVICE.

**B**LACKSTONE defines *law* as the rules of human action or conduct, but what is commonly understood by the term is the civil or municipal regulations of a nation as applied to a particular country. The forms of law which govern civil contracts and business intercourse are distinguished as statute and common. Statute law is the written law of the land, as enacted by State or national legislative bodies. The common law is grounded on the general customs of England, and includes the law of nature, the law of God, the principles and maxims of the law and the decisions of the superior courts. It overrides both the canon and the civil law where they go beyond or are inconsistent with it.

To the man involved in litigation the best advice is to go to the best lawyer he can find. But an ounce of prevention is worth a pound of cure, and the purpose of the following pages is to furnish the ounce of prevention. Knowledge is power in nothing so much as in business law, especially since the law presumes that no man is ignorant of the law.

### Business Law in Brief.

Ignorance of the law excuses no one.

It is a fraud to conceal a fraud.

The law compels no one to do impossibilities.

An agreement without consideration is void.

Signatures made with a lead pencil are good in law.

A receipt for money paid is not legally conclusive.

The act of one partner binds all the others.

The seal of a party to a written contract imports consideration.

A contract made with a minor cannot be enforced against him. A note made by a minor is voidable.

A contract made with a lunatic is void.

A contract made on a Sunday is void.

Principals are liable for the acts of their agents.

Agents are liable to their principals for errors.

Each individual in a partnership is liable for the whole amount of the debts of the firm.

A note which does not state on its face that it bears interest, will bear interest only after due.

A lease of land for a longer term than one year is void unless in writing.

An indorser of a note is exempt from liability if notice of its dishonor is not mailed or served within twenty-four hours of its non-payment.

In case of the death of the principal maker of a note the holder

## LEGAL ADVICE.

is not required to notify a surety that the note is not paid, before the settlement of the maker's estate.

Notes obtained by fraud, or made by an intoxicated person, are not collectible.

If no time of payment is specified in a note it is payable on demand.

An indorser can avoid liability by writing "without recourse" beneath his signature.

A check indorsed by the payee is evidence of payment in the drawer's hands.

An outlawed debt is revived should the debtor make a partial payment.

Want of consideration—a common defense interposed to the payment of negotiable paper—is a good defense between the original parties to the paper; but after it has been transferred before maturity to an innocent holder for value it is not a defense.

Negotiable paper, payable to bearer or indorsed in blank, which has been stolen or lost, cannot be collected by the thief or finder, but a holder who receives it in good faith before maturity, for value, can hold it against the owner's claims at the time it was lost.

Sometimes the holder of paper has the right to demand payment before maturity; for instance, when a draft has been protested for non-acceptance and the proper notices served, the holder may at once proceed against the drawer and indorsers.

If a note or draft is to be paid in the State where it is made, the contract will be governed by the laws of that State. When negotiable paper is payable in a State other than that in which it is made, the laws of that State will govern it. Marriage contracts, if valid where they are made, are valid everywhere. Contracts relating to personal property are governed by the laws of the place where made, except those relating to real estate, which are governed by the laws of the place where the land is situated.

If negotiable paper, pledged to a bank as security for the payment of a loan or debt, falls due, and the bank fails to demand payment and have it protested when dishonored, the bank is liable to the owner for the full amount of the paper.

### Agreements and Contracts.

A contract or agreement is where a promise is made on one side and assented to on the other, or where two or more persons enter into engagement with each other by a promise on either side. In a written contract assent is proven by the signature or mark. In verbal agreements it may be given by a word



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or a nod, by shaking of hands, or by a sign. The old saw, "Silence gives consent," is often upheld in law.

The conditions of a contract, as applying to individuals, are: 1. Age; 2. Rationality; and 3, as to Corporations, the possession of general or special statutory powers.

Persons under age are incompetent to make contracts, except under certain limitations. Generally such persons are incapable of making binding contracts.

As to rationality, the general principle of law is that all persons not rendered incompetent by personal disability, or by considerations of public policy, are capable of making a contract.

Corporations have powers to make contracts strictly within the limits prescribed by their charters, or by special or general statute.

The first step toward a contract is the proposition or offer, which may be withdrawn at any time before it is agreed to. When the proposition is verbal, and no time is specified, it is not binding unless accepted at once. To give one the option or refusal of property at a specified price, is simply to give him a certain time to make up his mind whether he will buy the property or not. To make the option binding he must accept within the time named. The party giving the option has the right to withdraw it, and sell the property to another, at any time previous to its acceptance, if the offer is gratuitous, and there is no consideration to support it.

If a letter of acceptance is mailed, and immediately after a letter withdrawing the offer is received, the contract is binding. An acceptance takes effect from the time it is mailed, not from the time it is received; it must, however, be in accordance with the original proposition, for any new matter introduced would constitute a new offer. When the offer is accepted, either verbally or in writing, it is an express assent, and is binding.

A contract made under a mistake of law is not void. Everybody is presumed to know the law. This, however, applies only to contracts permitted by law and clear of fraud.

A refusal of an offer cannot be retracted without the consent of the second party. Once a proposition is refused, the matter is ended. And no one has the right to accept an offer except the person to whom it was made.

The consideration is the reason or thing for which the parties bind themselves in the contract, and it is either a benefit to the promisor or an injury to the other party. Considerations are technically divided into *valuable* and *good*, and it sometimes happens that the consideration need not be expressed, but is implied. A valuable consideration is either money or property or service to be given, or some injury to be endured. A promise to marry is considered a valuable consideration. A good con-

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sideration means that the contract is entered into because of consanguinity or affection, which will support the contract when executed, but will not support an action to enforce an executory contract. Whether a consideration is sufficient or not is tested by its being a benefit to the promisor or an injury to the other party. If it has a legal value, it makes no difference how small that value may be. The promisor need not always be benefited, as, for instance, the indorser of a note, who is liable although he gets no benefit. But if a person promise to do something himself for which no consideration is to be received, there is no cause of action for breach of the contract.

There are several causes which void contracts, first among which is fraud. Fraud is defined to be "every kind of artifice employed by one person for the purpose of willfully deceiving another to his injury." No fraudulent contract will stand in law or in equity. The party upon whom the fraud has been practiced must void the contract as soon as he discovers the fraud, for if he goes on after having knowledge of the fraud he cannot afterwards avoid it. But the one who perpetrates the fraud cannot plead that ground for voiding it. Contracts in restraint of trade are void, as also are contracts in opposition to public policy, impeding the course of justice, in restraint of marriage, contrary to the insolvent acts, or for immoral purposes. Any violation of the essential requisites of a contract, or the omission of an essential requisite, will void it.

**DON'T** enter into an agreement on a Sunday unless it is ratified on a week day.

**DON'T** make a contract with a person of unsound mind or under the influence of liquor, or otherwise under restraint of liberty, mind or body. Use caution in making contracts with an illiterate, blind or deaf and dumb person, and see to it that witnesses are present.

**DON'T** put a forced construction on a contract—the intent of the parties is a contract.

**DON'T** suppose that you can withdraw a proposition made in writing and sent by mail after the party to whom it was made has mailed an unconditional acceptance.

**DON'T** suppose that a conditional acceptance of a proposition is binding on the party making the proposition.

**DON'T** forget that the courts will construe a contract according to the law prevailing where it was made.

**DON'T** forget that the law says, "no consideration, no contract," and that the courts will not enforce a contract which is too severe in its provisions.

**DON'T** sign an agreement unless you have carefully weighed its provisions, which should all be fixed and certain.

## Notes and Negotiable Paper.

The superstructure of business as it exists to-day rests on the broad foundation of confidence—the result of what may be called the evolution of commerce, and the principal stages in this evolution are an interesting study. First there was only barter in kind, as still practiced among savages—for example, the exchange of a bushel of corn for a handful of arrow-heads. Then came the introduction of money as a medium of exchange; and to-day we have the substitution of negotiable paper as documentary evidence of indebtedness, including promissory notes, due bills, drafts, checks, certificates of deposit, bills of exchange, bank bills, treasury notes (greenbacks), and all other evidences of debt, the ownership of which may be transferred from one person to another.

The mere acknowledgment of debt is not sufficient to make negotiable paper; the *promise* of payment or an *order* on some one to pay is indispensable. This promise must be for money only. The amount must be exactly specified. The title must be transferable. This feature must be visible on the face of the paper by the use of such words as "bearer" or "order." In some of the States peculiar phrases are ordered by statute, as "Payable without defalcation or discount," or "Payable at —," naming the bank or office.

A written agreement, signed by one person, to pay another, at a fixed time, a stated sum of money, is a *promissory note*. It becomes negotiable by being made payable to an order on some one or to bearer. As it is a contract, a consideration is one of its essential elements. Yet, although it be void as between the two first parties, being negotiable and coming into the hands of another person who gives value for it, not knowing of its defect, it has full force and may be collected.

The date is of great consequence. In computing time, the day of date is not counted, but it is the fixed point beginning the time at the end of which payment must be made. Omission of the date does not destroy a note, but the holder must prove to the time of its making. The promise to pay must be precise as to time which the note is to run. It must be at a fixed period, or conditional upon the occurrence of something certain to happen, as "at sight," "five days after sight," "on demand," "three months after date," "ten days after the death of John Doe." The time not being specified, the note is considered "payable on demand."

The maker, the person who promises and whose signature the note bears, must be competent. Insane people and idiots are *naturally*, and aliens, minors and married women may be *legally*, incompetent. The maker is responsible and binds himself to pay the amount stated on the note at its maturity. He need not

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pay it before it becomes due, but should he do so and neglect to cancel the note, he would be again responsible if any other person, without knowledge of such payment, acquired it for value before maturity. Even a receipt for payment from the first payee would not stand good against the subsequent holder.

The payee is the person in whose favor the note is drawn—the legal holder, the person to whom the money must be paid. When a note is made payable simply to bearer, without naming the payee, any one holding the note honestly may collect.

A subsequent party, one who comes into possession of the note after the original holder, has a better claim than the first one, for the reason that between the maker and the first payee there may have been, in the contract, some understanding or condition militating against the payment when it would become due, but the third person, knowing nothing of this, gives his value and receives the note. The law will always sustain the subsequent party.

The indorser is held responsible if the maker fails to pay when the note arrives at maturity. A note payable to order must be indorsed by a holder upon passing it to another, and, as value has been given each time, the last holder will look to his next preceding one and to all the others.

A note, being on deposit as collateral security, becoming due, the temporary holder is the payee and must collect.

An indorsement is a writing across the back of the note, which makes the writer responsible for the amount of the note. There are various forms of indorsement.

1. *In blank*, the indorser simply writing his name on the back of the note.

2. *General, or in full*, the indorser writing above his signature "Pay ——" or "Pay ——— or order."

3. *Qualified*, the words "without recourse" being used after the name of the payee in the indorsement.

4. *Conditional*, a condition being stated, as: "Pay ———, unless payment forbidden before maturity."

5. *Restrictive*, as: "Pay ——— only."

The blank indorsement, the full indorsement and the general indorsement are practically the same; each entitles the holder of the note to the money, and to look to the indorser for payment if the maker of the note defaults. It has even been held that in a general indorsement the holder had the right to fill in the words "or order" if he saw fit. The qualified indorsement releases the indorser from any liability in case the maker of the note defaults. The conditional and restrictive indorsement are used only in special cases. Each indorser is severally and collectively liable for the whole amount of the note indorsed if it is

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dishonored, provided it is duly protested and notice given to each. The indorser looks to the man who indorsed it before him, and so back to the original maker of the note. As soon as a note is protested, it is vitally necessary that notice should be sent to each person interested at once.

TO BE ON THE SAFE SIDE, it is well to see to it that any note offered for negotiation—

- Is dated correctly;
- Specifies the amount of money to be paid;
- Names the person to whom it is to be paid;
- Includes the words "or order" after the name of the payee, if it is desired to make the note negotiable;
- Appoints a place where the payment is to be made;
- States that the note is made "for value received;"
- And is signed by the maker or his duly authorized representative.

In some States phrases are required in the body of the note, such as, "without defalcation or discount;" but, as a general thing, that fact is understood without the statement.

### Partnership.

The general rule is that every person of sound mind, and not otherwise restrained by law, may enter into a contract of partnership.

There are several kinds of partners :

1. *Ostensible* partners, or those whose names are made public as partners, and who in reality are such, and who take all the benefits and risks.
2. *Nominal* partners, or those who appear before the public as partners, but who have no real interest in the business.
3. *Dormant*, or *silent* partners, or those whose names are not known or do not appear as partners, but who, nevertheless, have an interest in the business.
4. *Special*, or *limited* partners, or those who are interested in the business only to the amount of the capital they have invested in it.
5. *General* partners, who manage the business, while the capital, either in whole or in part, is supplied by a special partner or partners. They are liable for all the debts and contracts of the firm.

A nominal partner renders himself liable for all the debts and contracts of the firm.

A dormant partner, if it becomes known that he has an interest, whether creditors trusted the firm on his account or not, becomes liable equally with the other partners.

The regulations concerning special or limited partnerships, in

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any particular State where recognized, are to be found in the statutes of such State ; and strict compliance with the statutes is necessary in order to avoid incurring the responsibilities attaching to the position of general partner.

A person who lends his name as a partner, or who suffers his name to continue in the firm after he has actually ceased to be a partner thereof, is still responsible to third persons as a partner.

A partner may buy and sell partnership effects ; make contracts in reference to the business of the firm ; pay and receive money ; draw, and indorse, and accept bills and notes ; and all acts of such a nature, even though they be upon his own private account, will bind the other partners, if connected with matters apparently having reference to the business of the firm, and transacted with other parties ignorant of the fact that such dealings are for the particular partner's private account. The representation or misrepresentation of any fact made in any partnership transaction by one partner, or the commission of any fraud in such transaction, will bind the entire firm, even though the other partners may have no connection with, or knowledge of the same.

If a partner sign his individual name to negotiable paper, all the partners are bound thereby, if such paper appear on its face to be on partnership account. If negotiable paper of a firm be given by one partner on his private account, and in the course of its circulation pass into the hands of a *bona fide* holder for value, without notice or knowledge of the fact attending its creation, the partnership is bound thereby.

One partner cannot bind the firm by deed, though he may by deed execute an ordinary release of a debt due the partnership.

If no time be fixed in articles of copartnership for the commencement thereof, it is presumed to commence from the date and execution of the articles. If no precise period is mentioned for continuance, a partner may withdraw at any time, and dissolve such partnership at his pleasure ; and even if a definite period be agreed upon, a partner may, by giving notice, dissolve the partnership as to all capacity of the firm to bind him by contracts thereafter made. The withdrawing partner subjects himself, however, to a claim for damages by reason of his breach of the covenant.

The death of a partner dissolves the partnership, unless there be an express stipulation that, in such an event, the representatives of the deceased partner may continue the business in connection with the survivors, for the benefit of the widow and children.

A partnership is dissolved by operation of law ; by a voluntary and *bona fide* assignment by any partner of his interest therein ;

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by the bankruptcy or death of any of the partners ; or by a war between the countries of which the partners are subjects.

Immediately after a dissolution, notice of the same should be published in the papers, and a special notice sent to every person who has had dealings with the firm. If these precautions be not taken, each partner will still continue liable for the acts of the others to all persons who have had no notice of such dissolution.

DON'T enter into a partnership without carefully drawn articles, and don't sign the articles until the partnership funds are on deposit.

DON'T forget that a partner may be called upon to make good partnership losses with his individual property, and that each partner may be held for the acts of the other partners as well as for his own.

DON'T enter a firm already established unless you are willing to become responsible for its debts.

DON'T do anything out of the usual run of business without the consent of your partners.

DON'T mix private matters with partnership affairs, and don't continue in a partnership where trust and confidence are lacking.

DON'T continue a partnership after expiration of articles, and do not make any change without due public notice.

DON'T dissolve a partnership without due public notice or without designating a member to settle all matters outstanding.

### Agency and Attorney.

By agency is meant the substitution of one person by and for another, the former to transact business for the latter. An agency may be established by *implication*—an express agreement with a person that he is to become the agent of another not being necessary—or *verbally*, or by *writing*. A verbal creation of agency suffices to authorize the agent to make a contract even in cases where such contract must be in writing.

Agency is of three kinds : special, general and professional. A special agency is an authority exercised for a special purpose. If a special agent exceed the limits of his authority, his principal is not bound by his acts.

A general agency authorizes the transaction of all business of a particular kind, or growing out of a particular employment. The principal will be bound by the acts of a general agent, though the latter act contrary to *private* instructions, provided he keep, at the same time, within the general limits of his authority.

Professional agents are those licensed by the proper authority to transact certain kinds of business for a compensation. The

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following are among this class of agents : 1. Attorneys. 2. Brokers. 3. Factors. 4. Auctioneers. 5. Masters of Ships.

In regard to the subject of an agency, the general rule is, that whatever a man may do in his own right he may also transact through another. Things of a personal nature, implying personal confidence on the part of the person possessing them, cannot be delegated.

Infants, married women, lunatics, idiots, aliens, belligerents, and persons incapable of making legal contracts, cannot act as principals in the appointment of agents. Infants and married women may, however, become principals in certain cases.

Agency may be terminated in two ways : (1) by the act of the principal or agent ; (2) by operation of law. In the latter case, the termination of the agency is effected by lapse of time, by completion of the subject-matter of the agency, by the extinction of the subject-matter, or by the insanity, bankruptcy or death of either party.

DON'T do through another what would be illegal for you to do yourself.

DON'T lose any time in repudiating illegal acts of your agent.

DON'T make an illegal act of your agent's your own by accepting the benefit thereof.

DON'T transact business through an agent unless he can show that he stands in his principal's stead in the matter in hand.

DON'T, as agent, appoint sub-agents without the consent of your principal.

DON'T go beyond your authority in an agency unless you are willing to become personally responsible.

DON'T accept an agency, or act as an attorney in fact, in complicated matters unless your powers are clearly defined in writing.

### **Landlord and Tenant.**

Leases for one year or less need no written agreement. Leases for more than a year must be in writing ; if for life, signed, sealed, and witnessed in the same manner as any other important document.

Leases for over three years must be recorded. No particular form is necessary.

If no agreement in writing for more than a year can be produced, the tenant holds the property from year to year at the will of the landlord. If there is no agreement as to time, the tenant as a rule holds from year to year.

A tenancy at will may be terminated by giving the tenant one month's notice in writing, requiring him to remove from the premises occupied.



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A tenant is not responsible for taxes, unless it is so stated in the lease.

The tenant may underlet as much of the property as he desires, unless it is expressly forbidden in the lease. Tenants at will cannot underlet.

A married woman cannot lease her property under the common law, but this prohibition is removed by statute in most of the States. A husband cannot make a lease which will bind his wife's property after his death.

A lease made by a minor is not binding after the minor has attained his majority. It binds the lessee, however, unless the minor should release him. Should the minor receive rent after attaining his majority, the lease will be thereby ratified. A lease given by a guardian will not extend beyond the majority of the ward.

A new lease renders void a former lease.

In case there are no writings, the tenancy begins from the day possession is taken; where there are writings and the time of commencement is not stated, the tenancy will be held to commence from the date of said writings.

Leases on mortgaged property, whereon the mortgage was given prior to the lease, terminate when the mortgage is foreclosed.

Where a tenant assigns his lease, even with the landlord's consent, he will remain liable for the rent unless his lease is surrendered or cancelled.

There are many special features of the law of landlord and tenant in relation to agricultural tenancy. Generally an outgoing tenant cannot sell or take away the manure. A tenant whose estate has terminated by an uncertain event which he could neither foresee nor control is entitled to the annual crop which he sowed while his estate continued, by the law of emblements. He may also, in certain cases, take the emblements or annual profits of the land after his tenancy has ended, and, unless restricted by some stipulation to the contrary, may remove such fixtures as he has erected during his occupation for convenience, profit or comfort; for, in general, what a tenant has added he may remove, if he can do so without injury to the premises, unless he has actually built it in so as to make it an integral part of what was there originally.

The following are immovable fixtures: Agricultural erections, fold-yard walls, cart house, barns fixed in the ground, beast house, carpenter shop, fuel house, pigeon house, pineries substantially fixed, wagon house, box borders not belonging to a gardener by trade, flowers, trees, hedges, ale-house bar, dressers, partitions, locks and keys, benches affixed to the house,

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statue erected as an ornament to grounds, sun dial, chimney piece not ornamental, closets affixed to the house, conduits, conservatory, substantially affixed, doors, fruit trees if a tenant be not a nurseryman by trade, glass windows, hearths, millstones, looms substantially affixed to the floor of a factory, threshing machines fixed by bolts and screws to posts let into the ground.

DON'T occupy premises until a written lease is in your possession, and don't depend on promises of a landlord unless they are part of such lease.

DON'T accept a married woman as tenant unless the law of the State permit her to make an executory contract.

DON'T think that you can legally eject sub-tenants unless you have given them notice of the tenant's forfeiture of his lease.

DON'T make such improvements in premises occupied by you as the law would regard as immovable fixtures, unless you are willing to turn them over to the landlord when your lease expires. A building erected on foundations sunk into the ground would become part of the realty and thus belong to the landlord.

DON'T think, however, that you have no right to remove trade fixtures erected by you.

DON'T accept less than thirty days' notice when you rent by the month.

DON'T forget that where premises are let for illegal use the law will not aid you in collecting arrears for rent.

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### Law Relating to Farms, Etc.

In a deed to agricultural property the boundaries should be clearly determined. The question, What does the farmer get? is answered by these boundaries, and the deed to a farm always includes the dwelling houses, barns and other improvements thereon belonging to the grantor, even though these are not mentioned. It also conveys all the fences standing on the farm, but all might not think it also included the fencing-stuff, posts, rails, etc., which had once been used in the fence, but had been taken down and piled up for future use again in the same place. But new fencing material, just bought, and never attached to the soil, would not pass. So piles of hop poles, stored away, if once used on the land, and intended to be again so used, have been considered a part of it, but loose boards or scaffold poles, merely laid across the beams of a barn and never fastened to it, would not be, and the seller of the farm might take them away. Standing trees, of course, also pass, as part of the land; so do trees blown down or cut down, and still left in the woods where they fell, but not if cut and corded up for sale; the wood has then become personal property.

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If there be any manure in the barnyard or in the compost heap on the field, ready for immediate use the buyer ordinarily, in the absence of any contrary agreement, takes that also as belonging to the farm, though it might not be so if the owner had previously sold it to some other party, and had collected it together in a heap by itself, for such an act might be a technical severance from the soil, and so convert real into personal estate; and even a lessee of a farm could take away the manure made on the place while he was in occupation. Growing crops also pass by the deed of a farm unless they are expressly reserved, and when it is not intended to convey those it should be so stated in the deed itself; a mere oral agreement to that effect would not be; in most States, valid in law. Another mode is to stipulate that possession is not to be given until some future day, in which case the crops or manures may be removed before that time.

An adjoining road is, to its middle, owned by the farmer whose land is bound, unless there are reservations to the contrary in the deeds through which he derives title. But this ownership is subject to the right of the public to the use of the road.

If a tree grows so as to come over the land of a neighbor, the latter may cut away the parts which so come over, for he owns his land and all that is above or below it. If it be a fruit tree he may cut every branch or twig which comes over his land, but he cannot touch the fruit which falls to the land. The owner of the tree may enter peaceably upon the land of the neighbor and take up the branches and fruit.

### Lien Laws.

Any one who, as contractor, sub-contractor or laborer, performs any work, or furnishes any materials, in pursuance of, or in conformity with, any agreement or contract with the owner, lessee, agent or one in possession of the property, toward the erection, altering, improving or repairing of any building, shall have a lien for the value of such labor or materials on the building or land on which it stands to the extent of the right, title and interest of the owner, lessee or person in possession at the time of the claimant's filing his notice with the clerk of the county court. Such lien is called a mechanic's lien.

The notice should be filed within thirty days after completion of the work or the furnishing of the materials, and should state the residence of the claimant, the amount claimed, from whom due, when due, and to whom due, the name of the person against whom claimed, the name of the owner, lessee or person in possession of the premises, with a brief description of the latter.

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Liens cease in one year after the filing of the notice, unless an action is begun, or the lien is continued by an order of court.

The following classes of persons are generally entitled to lien:

1. Bailees, who may perform labor and services, on the thing bailed, at the request of the bailor. 2. Innkeepers, upon the baggage of guests they have accommodated. 3. Common carriers, upon goods carried, for the amount of their freight and disbursements. 4. Vendors, on the goods sold for payment of the price where no credit has been expressly promised or implied. 5. Agents, upon goods of their principals, for advancements for the benefit of the latter. 6. All persons are entitled to the right of lien who are compelled by law to receive property and bestow labor or expense on the same.

The right of lien may be waived: 1. By express contract. 2. By neglect. 3. By new agreement. 4. By allowing change of possession. 5. By surrendering possession.

The manner of the enforcement of a lien, whether it be an innkeeper's, agent's, carrier's, factor's, etc., depends wholly upon the nature and character of the lien.

DON'T purchase real estate unless the records have been thoroughly searched for all liens known to the law, or until all notices of action against the same have been discharged.

DON'T think that you have no right to sell perishable property on which you have a lien. Your lien will attach to the proceeds.

DON'T foreclose a lien without proper notice.

DON'T make payments to a contractor before you have full knowledge of all liens filed.

DON'T forget that liens take precedence according to priority, and that interest always runs on a judgment.

### Deeds—Transfer of Property.

A deed is a writing by which lands, tenements or hereditaments are conveyed, sealed and delivered. It must be written or printed on parchment or paper; the parties must be competent to contract; there must be a proper object to grant; a sufficient consideration; an agreement properly declared; if desired, it must have been read to the party executing it; it must be signed and sealed; attested by witnesses, in the absence of any statute regulation to the contrary; properly acknowledged before a competent officer; and recorded within the time and in the office prescribed by the State wherein executed.

The maker of a deed is the *grantor*; the party to whom it is delivered, the *grantee*. If the grantor have a wife, she must, in the absence of a statute to the contrary, sign and acknowledge the deed; otherwise, after the husband's death, she may claim the use of one-third, during her life.

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By a *general warranty* deed the grantor covenants to insure the lands against all persons whatsoever; by a *special warranty* deed he warrants only against himself and those claiming under him. In deeds made by executors, administrators or guardians there is generally no warranty. A *quit-claim deed* releases all the interest which the grantor has in the land, whatever it may be.

A *deed of trust* is given to a person called a trustee, to hold in fee simple, or otherwise, for the use of some other person who is entitled to the proceeds, profits or use.

A deed may be made void by alterations made in it after its execution; by the disagreement of the parties whose concurrence is necessary; or by the judgment of a competent tribunal.

Interlineations or erasures in a deed, made before signing, should be mentioned in a note, and witnessed in proper form. After the acknowledgment of a deed the parties have no right to make the slightest alteration. An alteration of a deed after execution, if made in favor of the grantee, vitiates the deed. If altered before delivery, such alteration destroys the deed as to the party altering it.

Abstracts of title are brief accounts of all the deeds upon which titles rest, and judgments and instruments affecting such titles.

The evidences of title are usually conveyances, wills, orders or decrees of courts, judgments, judicial sales, sales by officers appointed by law, acts of the Legislature and of Congress.

DON'T accept a deed unless all the following conditions are complied with: 1. It must be signed, sealed and witnessed. 2. Interlineations must be mentioned in the certificate of acknowledgment. 3. All the partners must join in a deed from a partnership. 4. A deed from a corporation should bear the corporate seal and be signed by officers designated in the resolution of the directors authorizing it. 5. A deed from a married woman should be joined in by the husband. 6. A deed from an executor should recite his power of sale. 7. The consideration must be expressed.

DON'T deed property to your wife direct. A deed to your wife does not cut off obligations contracted previously.

DON'T pay consideration money on a conveyance of real estate until the record has been searched to the moment of passing title, and unless you know of your own knowledge that no judgments, mortgages or tax liens are outstanding against the property.

DON'T delay in having a deed or mortgage recorded.

DON'T attempt to give a better title than you have yourself.

## Mortgages.

A mortgage is a conveyance of property, either real or personal, to secure payment of a debt. When the debt is paid the mortgage becomes void and of no value. In real estate mortgages the person giving the mortgage retains possession of the property, receives all the debts and other profits, and pays all taxes and other expenses. The instrument must be acknowledged, like a deed, before a proper public officer, and recorded in the office of the county clerk or recorder, or whatever officer's duty it is to record such instruments. All mortgages must contain a redemption clause and must be signed and sealed. The time when the debt becomes due, to secure which the mortgage is given, must be plainly set forth and the property conveyed must be clearly described, located and scheduled.

Some mortgages contain a clause permitting the sale of the property without decree of court when a default is made in the payment either of the principal sum or the interest.

A foreclosure is a statement that the property is forfeited and must be sold.

When a mortgage is assigned to another person, it must be for a valuable consideration; and the note or notes which it was given to secure must be given at the same time.

If the mortgaged property, when foreclosed and brought to sale, brings more money than is needed to satisfy the debt, interest and costs, the surplus must be paid to the mortgagor.

Satisfaction of mortgages upon real or personal property may be either—

1. By an entry upon the margin of the record thereof, signed by the mortgagee or his attorney, assignee or personal representative, acknowledging the satisfaction of the mortgage, in the presence of the recording officer; *or*—

2. By a receipt indorsed upon the mortgage, signed by the mortgagee, his agent or attorney, which receipt may be entered upon the margin of the record; *or*—

3. It may be discharged upon the record thereof whenever there is presented to the proper officer an instrument acknowledging the satisfaction of such mortgage, executed by the mortgagee, his duly authorized attorney in fact, assignee or personal representative, and acknowledged in the same manner as other instruments affecting real estate.

Chattel mortgages are mortgages on personal property. Most of the rules applicable to mortgages on real estate apply also to those on personal property, though in some States there are laws regulating personal mortgages. Any instrument will answer the purpose of a chattel mortgage which would answer as a bill of sale, with a clause attached providing for the avoidance of the mortgage when the debt is paid.

A chattel mortgage will not cover property subsequently —

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quired by the mortgagor. Mortgages of personal property should contain a clause providing for the equity of redemption. A mortgagee may sell or transfer his mortgage to another party for a consideration, but such property cannot be seized or sold until the expiration of the period for which the mortgage was given. Mortgages given with intent to defraud creditors are void.

DON'T lose any time in having a mortgage properly recorded.

DON'T pay installments on chattel mortgages unless the same are indorsed thereon.

DON'T lose sight of the fact that a chattel mortgage is a conditional bill of sale.

DON'T accept a chattel mortgage the term whereof is for more than a year.

DON'T neglect to have a chattel mortgage signed, sealed and witnessed, and don't fail to see to it that the schedule contains every article embraced under it.

DON'T fail to see to it that goods or chattels mortgaged to you are properly insured.

DON'T suppose that a chattel mortgage is valid when the debt to be secured by it is not.

DON'T give a chattel mortgage payable on demand unless you are prepared to forfeit the chattels at any moment.

DON'T think that destruction by fire or otherwise of the chattels mortgaged wipes out the debt.

DON'T forget that foreclosure in the case of a chattel mortgage is unnecessary except to cut off claims of other creditors.

### Assignments.

An assignment is a transfer of property made in writing. In effect it is passing to another person all of one's title or interest in any sort of real or personal property, rights, actions or estates. However, some things are not assignable; an officer's pay or commission, a judge's salary, fishing claims, Government bounties, or claims arising out of frauds or torts. Personal trusts cannot be assigned, as a guardianship or the right of a master in his apprentice.

Unlike many other legal devices the holder of an assignment is not bound to show that a valuable consideration was given. The owner of a cause of action may give it away if he pleases, and in the positive absence of evidence to the contrary the court will presume that the assignment was for a sufficient consideration.

Proof will be called for only when it appears that the assignment was a mere sham or fraudulent. No formality is required

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by law in an assignment. Any instrument between the contracting parties which goes to show their intention to pass the property from one to another will be sufficient. It may be proved, for instance, by the payee of a note, that he indorsed (or delivered without indorsement) the note to the assignee, and this is sufficient evidence of assignment.

In every assignment of an instrument, even not negotiable, the assignee impliedly warrants the validity of the instrument and the obligation of the third party to pay it. He warrants that there is no legal defense against its collection arising out of his connection with the parties; that all parties were legally able to contract, and that the amount is unpaid.

An assignment carries with it all the collateral securities and guaranties of the original debt, even though they are not mentioned in the instrument.

Where property is assigned for the benefit of creditors, its actual transfer to the assignee must be made immediately. When an assignment is made under the common law, the assignor may prefer certain creditors; but in a State where this sort of an assignment is governed by statute, no preference can be shown. An assignment for the benefit of creditors covers all of the assignor's property, wherever or whatever it may be, that is not exempt from execution.

When insured property is sold the insurance policy should be assigned. This can only be done with the consent of the insurer, and that consent must be at once obtained.

Correct schedules of the property assigned should accompany and be attached to every assignment.

### **Inns, Hotels and Boarding-houses.**

An inn, or hotel, is a place of entertainment for travelers. If an innkeeper opens his house for travelers, it is an implied engagement to entertain all persons who travel that way, and upon this universal assumption an action will lie against him for damages if he, without good reason, refuses to admit a traveler.

Innkeepers are responsible for the safe custody of the goods of their guests, and can limit their liability only by an express agreement or special contract with their guests; but if goods are lost through negligence of the owner himself the innkeeper's liability ceases. An innkeeper may retain the goods of his guest until the amount of the guest's bill has been paid.

A boarding-house is not an inn, nor is a coffee-house or eating-room. A boarding-house keeper has no lien on the goods of a boarder except by special agreement, nor is he responsible for their safe custody. He is liable, however, for loss caused by the



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negligence of his servants. An innkeeper is liable for loss without such negligence.

### **Bonds.**

A written instrument, admitting an obligation on the part of the maker to pay a certain sum of money to another specified person at a fixed time, for a valuable consideration, is called a bond. The obligor is the one giving the bond; the beneficiary is called the obligee. This definition applies to all bonds, but generally these instruments are given to guarantee the performance or non-performance of certain acts by the obligor, which being done or left undone, as the case may be, the bond becomes void, but if the conditions are broken it remains in full force. As a rule, the bond is made out for a sum twice the amount of any debt which is apt to be incurred by the obligor under its conditions, the statement being set forth that the sum named is the penalty, as liquidated or settled damages, in the event of the failure of the obligor to carry out the conditions.

An act of Providence, whereby the accomplishment of a bond is rendered impossible, relieves the obligor of all liability.

A bond for the payment of money differs from a promissory note only in having a seal.

### **Bills of Sale.**

A bill of sale is a formal written conveyance of personal property. If the property is delivered when sold, or if part of the purchase money is paid, a written instrument is not necessary to make the conveyance, but it is convenient evidence of the transfer of title. But, to protect the interests of the purchaser against the creditors of the seller, the bill is not sufficient of itself; there should also be a delivery of the property. If an actual and continued change of possession does not accompany the sale it is void as against the creditors of the seller and subsequent purchasers and mortgagees in good faith, unless the buyer can show that his purchase was made in good faith, without intent to defraud, and that there was some good reason for leaving the property in the hands of the seller.

### **Guaranty**

Is an assurance made by a second party that his principal will perform some specific act. For instance, A gives B a note, and C by indorsing the instrument guarantees to B that A will pay it at maturity. C is the guarantor. His liability is special, and if B renews the note when it becomes due he is no longer liable. A guaranty for collection is a very different thing from a guaranty of payment. The first warrants that the money is collect-

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ible; the latter, that it will be paid at maturity. In the first case the party guaranteed must be able to prove that due diligence was employed in attempting to collect the money; in the second, no such proof is necessary. The only form necessary in guaranteeing a note is writing one's name across the back of it,—a process commonly called indorsing.

### Corporations.

Several persons joining together for the accomplishment of any business or social purpose can legally organize themselves into a corporation, a form of partnership which combines the resources of all, and yet gives a limited pecuniary liability, amounting only to the amount of stock owned by each stockholder. In the States, the legislature of each Commonwealth enjoys the power of regulating the corporations, and in the Territories this power is, of course, vested in the General Government. The actual cost of organization amounts to something less than \$10, most of which is in fees to the Secretary of State. When the stock has been subscribed a meeting is called, and each shareholder casts a vote for every share which he owns or holds a proxy for, for each person who is to be elected director, or he may give one director as many votes as the number of shares he is voting, multiplied by the number of directors to be elected, amounts to, or distribute his votes as he chooses. Thus, if he owns ten shares of stock and there are six directors to be elected, he has sixty votes, which he can give, either ten for each director, or twenty for each of three, or sixty for one, or in any other way that he sees fit, so that his whole vote will not be more than sixty votes. These directors meet as soon after the election as possible and choose a president, vice-president, secretary, and treasurer, whereupon the corporation is ready for business.

The law in all the States on the subject of incorporating companies is very similar, and the necessary forms are to be obtained usually from the Secretary of State.

### Wills and How to Make Them.

Every description of property, whether real or personal, may be given by will. In the case of persons dying owing debts, however, the law gives to the executors sufficient of the personal property of the deceased to pay off all existing indebtedness, irrespective of the terms of the will; and where the personal property is not sufficient for this purpose, real property may be so appropriated.

Property may be bequeathed by will to all persons, including married women, infants, lunatics, idiots, etc.

Wills may be made by any person not disqualified by age or

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mental incapacity. Generally speaking, a person must have attained the age of twenty-one years before he or she can make a valid will of lands, and the same age, in many States, is required for a will of solely personal property.

In New York males of eighteen and females of sixteen are competent to bequeath personal property. "Sound and disposing mind and memory" are always essential to the validity of any will. For this reason, idiots, lunatics, intoxicated persons (during intoxication), and persons of unsound or weak minds, are incompetent to make wills. A will procured by fraud is also invalid, although the testator be fully competent to make a valid will. All wills must be in writing, except those made by soldiers in active service during war, and by sailors while at sea. Such persons may make a verbal or *nuncupative* will, under certain restrictions, as to witnesses, etc. No particular form of words is required.

A valid will must be subscribed or signed by the testator, or some one for him, in his presence, and at his request. The signature must be affixed in the presence of each of the witnesses. In case the will be signed by some one for him, the testator must *acknowledge* the signature to be his own in presence of the witnesses. The testator must declare to each of the subscribing witnesses that the instrument is his "last will and testament." This is of the utmost importance, and is called the "publication." There must be at least two (three are required in some of the States) subscribing witnesses, who must act as such at the testator's request, or at the request of some one in his presence. The subscribing witnesses must not be beneficially interested in the provisions of the will. These witnesses must all sign the will in the presence of the testator, and (in New York and some of the other States) in the presence of each other.

A codicil is an appendix annexed to the will after its execution, whereby the testator makes some change in, or addition to, his former disposition, and must be signed, published and attested in the same manner as the original will.

The revocation of a will may be express or implied. Express, by the execution of a new and later will, or by the intentional destruction of the old one, or by a formal written revocation, signed and witnessed in the same manner as the will itself. An implied revocation is wrought by the subsequent marriage of the testator and the birth of children, or by either.

DON'T leave anything uncertain in a will, and don't neglect to declare it to be your last will and testament.

DON'T make a will without two (better three) witnesses, none of whom must be interested in it. See that each witness writes his full name and address.

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DON'T make a new will unless you destroy or revoke the old one, and don't add a codicil unless it is executed in the same way as the original will.

DON'T neglect to make a new will if you mortgage or sell property devised or bequeathed in a prior one.

DON'T make a will which does not provide for children that may be born.

DON'T will property to a corporation whose charter does not permit it to take by devise or bequest.

DON'T fail to say "bequeath" for personal and "devise" for real property.

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### • Heirship to Property Not Bequeathed.

In England, where the policy is to keep landed estates undivided, the law of primogeniture prevails, giving to the eldest son and his descendants superior rights to the property. In case of default, the second son and his descendants become the heirs, and so on. If there be only daughters, they inherit equally.

In the United States the property would be divided among the heirs as follows: (1.) To the children. These, if of equal degree, receive the property in equal shares. If of unequal degree, the more remote descendants take the share that would have belonged to their parent, if living. Thus: A, B and C are children of the testator, and of these B and C are living and A is dead, at the testator's death. The estate, after paying all debts, will be divided into three equal parts, the descendants of A, together, receiving one-third, and B and C each another third; but in case A left no descendants, then B and C each will be awarded one half of the property. (2.) If there are no descendants the parents of the testator would receive the estate, the father being sometimes preferred to the mother. (3.) If parents are not living, the brothers and sisters of the testator would take the property, sharing equally. If one or more of the brothers or sisters had died, their children would receive the share that would have descended to their parent. (4.) Grandparents would be the next claimants, after which (5.) uncles and aunts, and after them (6.) their children, and so on. In case no heirs are found, the property inures to the State.

The above principles are stated as generally recognized in the laws of the several States. As these laws, however, vary, full information can only be obtained from the statutes of the several States.

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### Legacies and the Duties of Executors and Administrators.

A legacy is a gift or bequest of personal property by will or testament. Legacies are of three kinds: General, specific and demonstrative.

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A general legacy does not amount to a bequest of any particular portion of, or article belonging to, the personal estate of the testator, as distinguished from all others of the same kind; as a bequest of a sum of money, or a horse.

A specific legacy is a bequest of property specifically designated, so as to be definitely distinguished from the rest of the testator's estate; as, a bequest of all the money contained in a certain box, or the horse in the testator's stable.

A demonstrative legacy is a bequest of a certain amount of money to be paid out of a particular fund; as, a bequest of \$500 to be paid out of the proceeds of the sale of certain property.

An executor should first extinguish all the lawful debts of the testator, and for this purpose all the personal property may be applied, if necessary, even though some of it has been bequeathed in specific legacies. After the debts are paid, the specific legacies are next to be satisfied; then the demonstrative legacies; and lastly, the general legacies. If there be insufficient assets to satisfy any of the legacies in either of these three classes successively, those in the same class will be paid ratably and in proportion, and subsequent classes will fail entirely.

Residuary legatees take subject to all other legacies. A residuary legatee is one to whom is bequeathed "all the rest, residue and remainder" of an estate.

Specific and general legacies are subject to ademption; thus, if the testator bequeath "the horse in his stable," and at the time of his death has no horse, the legacy fails entirely and is said to be "adeemed." Or, if the legacy bequeaths the furniture in a certain specified house, and the testator remove the furniture to another house, the legacy is adeemed.

Legacies are vested, or contingent. A vested legacy is one where the legatee acquires an absolute present right to present or future enjoyment. A contingent legacy is one where the right of enjoyment depends upon some contingency; as, a gift to a child *if* he attains the age of twenty-one years. A cumulative legacy is one additional to a previous legacy contained in the same will.

In New York, and several other States, a legacy given to a subscribing witness of a will is void. An executor may be a legatee. It is also provided that "no person having a husband, wife, child, or parent, shall bequeath to a corporation more than one half of his personal estate after the payment of his debts."

Legacies are not required to be paid in less than one year from the time of the testator's death. This time is allowed to the executor to enable him to ascertain the nature and value of the property, the full liabilities of the testator and to collect the assets.

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A legacy to an infant should not be paid except under order of the court, and such order will be governed by the laws of the State.

DON'T become an executor or administrator unless you are willing and have time to attend to the duties, and don't enter upon a trust until you thoroughly understand your duties and powers.

DON'T mix trust and personal funds.

DON'T pay out a dollar of trust money without proper vouchers, and don't fail to keep accurate accounts.

DON'T liquidate any claim until you have the whole estate in hand.

DON'T pay a bequest before the time fixed in the will without deducting interest.

DON'T give a promissory note as executor or administrator.

DON'T execute a contested will, or compromise a claim due an estate, without the advice and consent of the court.

DON'T incur any other expenses than those of the burial until the will is properly probated, but do not hesitate to sell perishable property.

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### The Right of Dower.

Dower is one-third part of the husband's estate, and in general cannot be destroyed by the mere act of the husband. Hence, in the sale of real estate by the husband, his wife must, with the husband, sign the conveyance to make the title complete to the purchaser. In the absence of such signature, the widow can claim full dower rights after the husband's death. Creditors, also, seize the property subject to such dowry rights.

The husband in his will sometimes gives his wife property in lieu of dower. In this case she may, after his death, elect to take either such property or her dower; but she cannot take both. While the husband lives the wife's right of dower is only *inchoate*; it cannot be enforced. Should he sell the land to a stranger, she has no right of action or remedy until his death.

In all cases the law of the State *in which the land is situated* governs it, and, as in the case of heirship, full information must be sought for in statute which is applicable.

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### Marriage and Divorce.

Marriage may be entered into by any two persons, with the following exceptions: Idiots, lunatics, persons of unsound mind, persons related by blood or affinity within certain degrees prohibited by law, infants under the age of consent, which varies in the different States, and all persons already married and not legally divorced.

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The violation of the marriage vow is cause for absolute divorce in all the States and Territories, excepting South Carolina and New Mexico, which have no divorce laws.

Physical inability is a cause in all the States *except* Cal., Conn., Dak., Ia., La., N. M., N. Y., S. C., Tex. and Vt. In most of these States it renders marriage voidable.

Willful desertion, one year, in Ark., Cal., Col., Dak., Fla., Ida., Kan., Ky., Mo., Mon., Nev., Utah, Wis., W. T. and Wyo.

Willful desertion, two years, in Ala., Ariz., Ill., Ind., Ia., Mich., Miss., Neb., Pa. and Tenn.

Willful desertion, three years, in Conn., Del., Ga., Me., Md., Mass., Minn., N. H., N. J., O., Ore., Tex., Vt. and W. Va.

Willful desertion, five years in Va. and R. I., though the court *may* in the latter State decree a divorce for a shorter period.

Habitual drunkenness, in all the States and Territories, *except* Md., N. J., N. Y., N. C., Pa., S. C., Tex., Vt., Va. and W. Va.

"Imprisonment for felony" or "conviction of felony" in all the States and Territories (with limitations), *except* Dak., Fla., Me., Md., N. J., N. M., N. Y., N. C., S. C. and Utah.

"Cruel and abusive treatment," "Intolerable cruelty," "extreme cruelty," "repeated cruelty," or "inhuman treatment," in all the States and Territories *except* N. J., N. M., N. Y., N. C., S. C., Va. and W. Va.

Failure by the husband to provide; one year in Cal., Col., Dak., Nev. and Wyo.; two years in Ind. and Ida.; no time specified in Ariz., Ida., Mass., Mich., Me., Neb., R. I., Vt. and Wis.; willful neglect for three years in Del.

Fraud and fraudulent contract in Ariz., Conn., Ga., Ida., Kan., Ky., O., Pa. and W. T.

Absence without being heard from: three years in N. H.; seven years in Conn. and Vt.; separation five years, in Ky.; voluntary separation, five years, in Wis. When reasonably presumed dead by the court, in R. I.

"Ungovernable temper," in Ky.; "habitual indulgence in violent and ungovernable temper," in Fla.; "cruel treatment, outrages or excesses as to render their living together insupportable" in Ark., Ky., La., Mo., Tenn. and Tex.; "indignities as render life burdensome," in Mo., Ore., Pa., Tenn., W. T. and Wyo.

In Ga. an absolute divorce is granted only after the concurrent verdict of two juries at different terms of the court. In N. Y. absolute divorce is granted for but one cause, adultery.

All of the causes above enumerated are for absolute or full divorce, and collusion and connivance are especially barred, and also condonation of violation of the marriage vow.

The courts of every State, and particularly of New York, are very jealous of their jurisdiction, and generally refuse to recognize as valid a divorce against one of the citizens of the State by the court of another State, unless both parties to the suit were subject at the same time to the jurisdiction of the court granting the divorce.

**Previous Residence Required.**—Dak., ninety days; Cal., Ind., Ida., Neb., Nev., N. M., Tex. and Wyoming, six months; Ala., Ariz., Ark., Col., Ill., Ia., Kan., Ky., Me., Miss., Minn., Mich., Mo., Mont., N. H., O., Ore., Pa., Utah, Vt. (both parties as husband and wife), W. Va., W. T. and Wis., one year; Fla., Md., N. C., R. I. and Tenn., two years; Conn. and Mass. (if, when married, both parties were residents; otherwise five years), three years.

**Remarriage.**—There are no restrictions upon remarriage by divorced persons in Conn., Ky., Ill. and Minn. Defendant must wait two years and obtain permission from the court in Mass. The decree of the court *may* restrain the guilty party from remarrying in Va. Parties cannot remarry until after two years, except

## LEGAL ADVICE.

by permission of the court, in Me. In N. Y. the plaintiff may remarry, but the defendant cannot do so during the plaintiff's lifetime, unless the decree be modified or proof that five years have elapsed, and that complainant has married again and defendant's conduct has been uniformly good. Any violation of this is punished as bigamy, even though the other party has been married. In Del., Pa. and Tenn., no wife or husband divorced for violation of the marriage vow can marry the *particeps criminis* during the life of the former husband or wife, nor in La. at any time; such marriage in La. renders the person divorced guilty of bigamy.

### Rights of Married Women.

Any and all property which a woman owns at her marriage, together with the rents, issues and profits thereof, and the property that comes to her by descent, devise, bequest, gift or grant, or which she acquires by her trade, business labor, or services performed on her separate account, shall, notwithstanding her marriage, remain her sole and separate property, and may be used, collected and invested by her in her own name, and shall not be subject to the interference or control of her husband, or be liable for his debts, unless for such debts as may have been contracted for the support of herself or children by her as his agent.

A married woman may likewise bargain, sell, assign, transfer and convey such property, and enter into contracts regarding the same on her separate trade, labor or business with the like effect as if she were unmarried. Her husband, however, is not liable for such contracts, and they do not render him or his property in any way liable therefor. She may also sue and be sued in all matters having relation to her sole and separate property in the same manner as if she were sole.

In the following cases a married woman's contract may be enforced against her and her separate estate: 1. When the contract is created in or respecting the carrying on of the trade or business of the wife. 2. When it relates to or is made for the benefit of her sole or separate estate. 3. When the intention to charge the separate estate is expressed in the contract creating the liability.

When a husband receives a principal sum of money belonging to his wife, the law presumes he receives it for her use, and he must account for it, or expend it on her account by her authority or direction, or that she gave it to him as a gift.

If he receives interest or income and spends it with her knowledge and without objection, a gift will be presumed from acquiescence.

Money received by a husband from his wife and expended by him, under her direction, on his land, in improving the home of the family, is a gift, and cannot be recovered by the wife, or reclaimed, or an account demanded.

An appropriation by a wife, herself, of her separate property to the use and benefit of her husband, in the absence of an agree-



## *LEGAL ADVICE.*

ment to repay, or any circumstances from which such an agreement can be inferred, will not create the relation of debtor and creditor, nor render the husband liable to account.

Though no words of gift be spoken, a gift by a wife to her husband may be shown by the very nature of the transaction, or appear from the attending circumstances.

A wife who causelessly deserts her husband is not entitled to the aid of a court of equity in getting possession of such chattels as she has contributed to the furnishing and adornment of her husband's house. Her legal title remains, and she could convey her interest to a third party by sale, and said party would have a good title, unless her husband should prove a gift.

Wife's property is not liable to a lien of a sub-contractor for materials furnished to the husband for the erection of a building thereon, where it is not shown that the wife was notified of the intention to furnish the materials, or a settlement made with the contractor and given to the wife, her agent or trustee.

The common law of the United States has some curious provisions regarding the rights of married women, though in all the States there are statutory provisions essentially modifying this law. As it now stands the husband is responsible for necessities supplied to the wife even should he not fail to supply them himself, and is held liable if he turn her from his house, or otherwise separates himself from her without good cause. He is not held liable if the wife deserts him, or if he turns her away for good cause. If she leaves him through good cause, then he is liable. If a man lives with a woman as his wife, and so represents her, even though this representation is made to one who knows she is not, he is liable the same way as if she were his wife.

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### **Arbitration.**

Arbitration is an investigation and determination of subjects of difference between persons involved in dispute, by unofficial persons chosen by the parties in question.

The general rule is that any person capable of making a valid contract concerning the subject in dispute may be a party to an arbitration. Any matter which the parties may adjust by agreement, or which may be made the subject of a suit at law, may be determined by arbitration. Crimes cannot be made the subject matter of an arbitration. This matter is regulated by statute in the different States.

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### **The Law of Finding.**

The general rule is that the finder has a clear title against every one but the owner. The proprietor of a hotel or a shop

## LEGAL ADVICE

has no right to demand property of others found on his premises. Such proprietor may make regulations in regard to lost property which will bind their employes, but they cannot bind the public. The finder has been held to stand in the place of the owner, so that he was permitted to prevail in an action against a person who found an article which the plaintiff had originally found, but subsequently lost. The police have no special rights in regard to articles lost, unless those rights are conferred by statute. Receivers of articles found are trustees for the owner or finder. They have no power in the absence of special statute to keep an article against the finder, any more than the finder has to retain an article against the owner.

### Number of Miles by Water from New York to

Amsterdam.....	3,510	Kingston.....	1,640
Bermudas.....	660	Lima ..	11,310
Bombay.....	11,574	Liverpool.....	3,210
Boston.....	310	London.....	3,375
Buenos Ayres.....	7,110	Madras.....	11,850
Calcutta.....	12,425	Naples.....	4,330
Canton.....	13,900	New Orleans.....	2,045
Cape Horn ..	8,115	Panama.....	2,358
Cape of Good Hope.....	6,830	Pekin.....	15,325
Charleston.....	750	Philadelphia.....	240
Columbia River.....	15,965	Quebec.....	1,400
Constantinople.....	5,140	Rio Janeiro.....	3,840
Dublin.....	3,225	Sandwich Islands.....	15,300
Gibraltar.....	3,300	San Francisco.....	15,858
Halifax.....	612	St. Petersburg.....	4,420
Hamburg.....	3,775	Valparaiso.....	9,750
Havana.....	1,420	Washington.....	400
Havre.....	3,210	Around the Globe.....	25,000

### Dimensions of the Oceans.

	Area, Sq. Miles.	Av. Depth.		Area, Sq. Miles.	Av. Depth.
Pacific ..	68,000,000	12,780 feet	Antarctic.	8,500,000	6,000 feet
Atlantic.	35,000,000	12,060 "	Arctic.....	5,000,000	5,100 "
Indian....	25,000,000	10,980 "			

### Inland Seas of the World.

Name.	Area, Sq. Miles.	Depth.	Name.	Area, Sq. Miles.	Depth.
Caspian Sea...	176,000	250 ft.	Lake Erie.....	10,815	204 ft.
Sea of Aral....	30,000	100 "	Lake Ontario ..	6,300	336 "
Dead Sea ....	303	200 "	Lake Nicaragua.	6,000	300 "
Lake Balkal... 12,000	750 "		Lake Titacaca..	3,012	800 "
Lake Superior.	32,000	1,000 "	Salt Lake .....	1,875	1,400 "
Lake Michigan.	22,400	1,000 "	Lake Tchad....	14,000	350 "
Lake Huron...	21,000	1,000 "	Lake Lodoga...	12,000	1,200 "

# BUSINESS AND LEGAL FORMS.

## SHORT FORM OF ASSIGNMENT OF WRITTEN INSTRUMENT.

FOR VALUE RECEIVED, I do hereby assign, transfer and set over unto C D, and his assigns, all my right, title and interest in and to the within written instrument, this ..... day of ....., A.D. 1890. A B.

## ORDINARY BILL OF EXCHANGE, OR DRAFT AT A TIME AFTER SIGHT.

\$250. *Ten days* after sight, pay to the order of W F, *two hundred and fifty* dollars, for value received, and charge the same to account of  
To M. B. & Co., } J. H. C. & Co.,  
New York City, } Chicago,  
N Y. } Illinois.

When a draft is payable at sight, commence thus:  
"At sight, pay," etc.

## GENERAL FORM OF AGREEMENT.

THIS AGREEMENT, made this ..... day of ....., one thousand eight hundred and ....., between A B, of ....., county of ....., and State of Illinois, of the first part, and C D, of ....., in said county and State, of the second part—

Witnesseth, that the said A B, in consideration of the covenants and agreements on the part of the party of the second part hereinafter contained, doth covenant and agree to and with the said C D, that (here insert the agreement on the part of A B).

And the said C D, in consideration of the covenants on the part of the party of the first part, doth covenant and agree to and with the said A B, that (here insert the agreement on the part of C D).

IN WITNESS WHEREOF, we have hereunto set our hands and seals, the day and year first above written.

A B. [SEAL.]  
C D. [SEAL.]

## COMMON FORM OF BOND FOR PAYMENT OF MONEY.

KNOW ALL MEN BY THESE PRESENTS, that I, A B, of ....., in the county of ....., and State of Illinois, am held and firmly bound unto C D, of ....., in the county of ....., and State aforesaid, in the sum of . .... dollars, to be paid to the said C D, his executors, administrators and assigns, to which payment, well and truly to be made, I bind myself, my heirs, executors and administrators, and every of them, firmly by these presents.

Sealed with my seal, the ..... day of ....., A.D. 1890.

The condition of this obligation is such, that if the above bound A B, his heirs, executors and administrators, or either of them, shall well and truly pay, or cause to be paid, unto the said C D, his executors, administrators or assigns, the just and full sum of ..... dollars, with interest thereon, at the yearly rate of ..... per cent. for the same, on or before the ..... day of ....., A.D. 1890, then this obligation to be void and of no effect; otherwise to remain in full force.

A B. [SEAL.]

## FORM OF BILL OF SALE OF GOODS OR PERSONAL PROPERTY.

KNOW ALL MEN BY THESE PRESENTS, that I, A B, of ....., in the county of ....., and State of Illinois, in consideration of the sum of ..... dollars, to me paid by C D, of ....., at and before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, have bargained, sold and delivered, and by these presents do bargain, sell and deliver unto the said C D, the following goods and chattels, to wit: (Here insert a bill of particular goods sold or personal property).

To have and to hold the said goods and chattels unto the said C D, his executors, administrators and assigns, to his and their own proper use and benefit forever. And I, the said A B, for myself and my heirs, executors and administrators, do warrant and will defend the said bargained premises unto the said C D, his executors, administrators and assigns, from and against all persons whomsoever.

IN WITNESS WHEREOF, I have hereunto set my hand and seal, this ..... day of ....., A.D. 1890.

A B. [SEAL.]

## FORM OF BOND FOR A DEED.

KNOW ALL MEN BY THESE PRESENTS, that I, A B, of the county of ....., and State of Illinois, am held and firmly bound unto C D, of the county of ....., and State aforesaid, in the penal sum of ..... dollars, to be paid unto the said E F, his heirs, executors, administrators or assigns, to which payment, well and truly to be made, I bind myself, my heirs, executors and administrators, and every of them, firmly by these presents.

Sealed with my seal, this ..... day of ....., A.D. 1890.

The condition of the above obligation is such, that whereas the above bounden A B has this day bargained and sold to the said C D, his heirs and assigns, for the sum of ..... dollars, the following described lot or parcel of land, to-wit: (here describe the land,) which sum of ..... dollars is to be paid in manner following: ..... dollars at the ensembling and delivery hereof, and ..... dollars in ..... from the date hereof.

Upon the payment of the said sums being made, at the time and in the manner aforesaid, the said A B, for himself, his heirs, executors and assigns, covenants and agrees, to and with the said C D, his heirs and assigns, to execute a good and sufficient deed of conveyance, in fee simple, free from all incumbrance, with full and proper covenants of warranty for the above described premises.

Now, if the said A B shall well and truly keep, observe and perform his said covenants and agreements herein contained, on his part, then this obligation to be void; otherwise to remain in full force and virtue. A B. [SEAL.]

## POWER OF ATTORNEY.

KNOW ALL MEN BY THESE PRESENTS, that I, A B, of ....., in the county of ....., and State of Illinois, have made, constituted and appointed, and by these presents do make, constitute and appoint, C D, of ....., to be my true and lawful attorney, for me and in my name, and for my sole use, to (here state the specific purposes of the power given), hereby giving and granting unto my said attorney full power and authority in the premises to use all lawful means in my name, and for my sole benefit for the purposes aforesaid. And generally to do and perform all such acts, matters and things as my said attorney shall deem necessary or expedient for the completion of the authority hereby given, as fully as I might and could do if I were personally present; hereby ratifying and confirming all the acts of my said attorney or his substitutes, done by virtue of these presents.

IN WITNESS WHEREOF, I have hereunto set my hand and seal, this ..... day of ....., A.D. 1890. A B. [SEAL.]

## WARRANTY DEED.

The grantor (here insert name or names and place of residence), for and in consideration of (here insert consideration) in hand paid, conveys and warrants to (here insert the grantee's name or names) the following described real estate (here insert description), situated in the county of ....., in the State of Illinois.

Dated this ..... day of ....., A.D. 18..

A B. [SEAL.]

## QUIT CLAIM DEED.

The grantor (here insert grantor's name or names and place of residence), for the consideration of (here insert consideration), convey and quit claim to (here insert grantee's name or names) all interest in the following described real estate (here insert description), situated in the county of ....., in the State of Illinois.

Dated this ..... day of ....., A.D. 18..

A B. [SEAL.]

## MORTGAGE.

The mortgagor (here insert name or names) mortgages and warrants to (here insert name or names of mortgagee or mortgagees), to secure the payment of (here recite the nature and amount of indebtedness, showing when due and the rate of interest, and whether secured by note or otherwise), the following described real estate (here insert description thereof), situated in the county of ....., in the State of Illinois.

A B. [SEAL.]

Dated this ..... day of ....., A.D. 18..

## FORM OF CERTIFICATE OF ACKNOWLEDGMENT TO DEED OR OTHER INSTRUMENT.

State of (name of State),

County of (name of County). }

I (here give name of officer and his official title) do hereby certify that (name of grantor, and if acknowledged by wife, her name, and add "his wife,") personally

## BUSINESS AND LEGAL FORMS.

known to me to be the same person whose name is (or are) subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that he (she or they) signed, sealed or delivered the said instrument as his (her or their) free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and (private or official, as the case may be) seal, this ..... day of ....., A.D. 18.. (Signature of officer.) [SEAL.]

### SHORT FORM OF LEASE.

THIS INSTRUMENT, made this ..... day of ....., A.D. 18.., between A B, party of the first part, and C D, party of the second part, witnesseth, that the said party of the first part, in consideration of the covenants of the party of the second part, hereinafter set forth, do.. by these presents, lease to the party of the second part, the following described property, to-wit: (here describe the premises), in the county of ....., and State of ..... To have and to hold the same, to the party of the second part, from the ..... day of ....., 18.., to the ..... day of ....., 18.. And the party of the second part, in consideration of the leasing of said premises, covenants and agrees to pay the party of the first part, at ....., as rent for the same, the sum of ....., payable as follows, to-wit: (Here set forth the terms of payment.)

And the party of the second part covenants with the party of the first part that at the expiration of the term of this lease.. he.. will yield up the premises to the party of the first part, without further notice, in as good condition as when the same were entered upon by the party of the second part, loss by fire or inevitable accident and ordinary wear excepted, and that neither.. he.. nor..... legal representatives will underlet said premises, or any part thereof, or assign this lease, without the written assent of the party of the first part first had thereto.

And it is further expressly agreed between the parties hereto, that if default shall be made in the payment of the rent above reserved, or any part thereof, or any of the covenants or agreements herein contained to be kept by the party of the second part, it shall be lawful for the party of the first part or..... legal representatives, into and upon said premises, or any part thereof, either with or without process of law, to re-enter and re-possess the same at the election of the party of the first part, and to distrain for any rent that may be due thereon upon any property belonging to the party of the second part. And in order to enforce a forfeiture for non-payment of rent, it shall not be necessary to make a demand on the same day the rent shall become due, but a failure to pay the same at the place aforesaid, or a demand and a refusal to pay on the same day or at any time on any subsequent day, shall be sufficient; and after such default shall be made, the party of the second part and all persons in possession under ..... shall be deemed guilty of a forcible detainer of said premises under the statute.

And it is further covenanted and agreed between said parties that (here set forth any further stipulation agreed upon.) The covenants herein shall extend to and be binding upon the heirs, executors and administrators of the parties to this lease.

Witness the hands and seals of said parties, the day and year first above written.

A B. [SEAL.]  
C D. [SEAL.]

### FORM OF WILL.

I, A B, of ....., in the county of ....., and State of Illinois, of the age of ..... years, of sound mind and memory, do make, publish and declare this my last will and testament in the manner following: That is to say,

First, I give and bequeath to (here may be set forth the manner of disposition of personal property, and the names of persons and amount to each.)

Second, I give and devise to (here set forth the manner of disposition of real property, and the names of persons to whom devised, concluding as follows:) To have and to hold the same and the several tracts and parcels thereof to the said ....., his heirs and assigns forever.

And lastly, I do hereby nominate and appoint ..... to be executor of this my last will and testament, hereby revoking all former wills by me made. (Add the following clause if desired:) And I do direct that my said executor shall not be obliged to give security as such.

## BUSINESS AND LEGAL FORMS.

In witness whereof, I have hereunto set my hand and seal this ..... day of ..... A.D. 18.. A B. [SEAL.]

The above instrument, consisting of one sheet (or two sheets, as the case may be) was at the date thereof signed, sealed, published and declared by the said A B as and for his last will and testament, in presence of us, who, at his request and in his presence, and in the presence of each other, have subscribed our names as witnesses thereto (or, "the above instrument, consisting of one sheet was at the date thereof, declared to us by the said A B, the testator therein mentioned, to be his last will and testament; and at the same time acknowledged to us, and each of us, that he had signed and sealed the same, and we therefore, at his request and in his presence, and in the presence of each other, signed our names thereto as attesting witnesses.")

C D, residing at ....., in ..... county.

G H, residing at ....., in ..... county.

The foregoing is the general form of will, which can be varied in case of several devisees and legatees, according to the facts or as circumstances may require.

A *devisee* is one to whom *real* property is devised in the will.

A *legatee* is one to whom *personal* property is given in the will.

### BILL OF SALE.

KNOW ALL MEN BY THESE PRESENTS, that I, E D, of the town of ....., county of ....., State of ....., of the first part, for and in consideration of the sum of one hundred dollars, lawful money of the United States, to me in hand paid, at or before the ensembling and delivery of these presents, by C B, of the second part, the receipt whereof is hereby acknowledged, have bargained, sold, granted and conveyed, and by these presents do bargain, sell, grant and convey unto the said party of the second part, his executors, administrators and assigns (here set out the articles sold), to have and to hold the same unto the said party of the second part, his executors, administrators and assigns, forever. And I do for myself, my heirs, executors and administrators, covenant and agree to and with the said party of the second part, to warrant and defend the said described goods hereby sold unto the said party of the second part, his executors, administrators and assigns, against all and every person and persons whatsoever.

IN WITNESS WHEREOF, I have hereunto set my hand and seal the ..... day of ..... 18.. E D. [SEAL.]

Signed, sealed and delivered }  
in the presence of B B. }

### PROMISSORY NOTE.

\$200. Baltimore, ....., 18..  
Thirty days after date I promise to pay B B, or order (or bearer), two hundred dollars, for value received. B. E.

### JOINT PROMISSORY NOTE.

\$1,050. Memphis, ....., 18..  
Sixty days after date we jointly promise to pay C D, or order (or bearer), one thousand and fifty dollars, for value received. A C.  
B H.

### NOTE PAYABLE ON DEMAND.

\$100. Mobile, ....., 18..  
On demand, for value received, I promise to pay H B, or order (or bearer), one hundred dollars (with interest). C. C.

### NOTE PAYABLE AT BANK.

\$300. St. Louis, ....., 18..  
Thirty days after date, for value received, I promise to pay C D A, or order (or bearer), three hundred dollars, at the German-American Savings Bank. D R S.

### NOTE NOT NEGOTIABLE.

\$100. Madison, ....., Ga., 18..  
Two months after date I promise to pay J H, one hundred dollars, for value received. B B.

### NOTE WITH SURETY.

\$75. Columbus, Miss., ....., 18..  
Six months from date I promise to pay E G, or order (or bearer), seventy-five dollars, for value received. B B.  
X X.

## NOTE PAYABLE BY INSTALLMENTS.

**\$500.** Albany,....., 18..  
 For value received, I promise to pay A C, or order (or bearer), five hundred dollars, in the following manner: One hundred dollars in three months, two hundred dollars in nine months, one hundred dollars in twelve months, and one hundred dollars in fifteen months, from date, with interest on the several sums as they may become due. W Z.

### DUE BILL.

**\$50.** Cincinnati,....., 18..  
 Due A W, fifty dollars, with interest from this date. M A.

### DRAFT AT SIGHT.

**\$100.** Chicago, ..... , 18..  
 At sight, pay J C, or order, one hundred dollars, and charge the same to my account. C E B.  
 To A X.

### BILL OF EXCHANGE.

**\$500.** New York,....., 18..  
 Fifteen days after sight (or as many days as may be agreed upon), pay to the order of Mr. B B, five hundred dollars, and charge the same to the account of To L M, St. Louis, Mo. C D.

## HIGH WATER

At the following places may be found for each day by adding to, or subtracting from, the time of high water at New York the hours and minutes given. The \* denotes time to be *added*; the † to be *subtracted*. The interval between tides is approximately twelve hours.

	Time.		Time.
Albany, N. Y.*	9:39	Newport, R. I.†	0:22
Annapolis, Md.*	8:57	Norfolk, Va.*	0:56
Atlantic City, N. J.†	0:18	Norwich, Conn.*	2:05
Baltimore, Md.*	10:52	Old Point Comfort, Va.*	0:37
Block Island, R. I.†	0:53	Philadelphia, Pa.*	5:37
Boston, Mass.*	3:22	Plymouth, Mass.*	3:12
Bridgeport, Conn.*	3:04	Point Lookout, Me.*	4:49
Bristol, R. I.†	0:02	Portland, Me.*	3:10
Cape May, N. J.*	0:12	Portsmouth, N. H.*	3:16
Charleston, S. C.†	0:43	Poughkeepsie, N. Y.*	4:27
Eastport, Me.*	3:01	Providence, R. I.*	0:07
Fernandina, Fla.†	0:19	Richmond, Va.*	8:47
Gloucester, Mass.*	2:57	Rockaway Inlet, N. Y.†	0:26
Isles of Shoals*	3:11	Rockland, Me.*	2:55
Jacksonville, Fla.*	0:36	Rockport, Mass.*	2:50
Key West, Fla.*	1:23	Salem, Mass.*	3:05
Marblehead, Mass.*	3:04	Sandy Hook, N. J.*	0:36
Nahant, Mass.*	3:02	Savannah, Ga.†	0:49
Nantucket, Mass.*	4:31	Vineyard Haven, Mass.*	3:35
New Bedford, Mass.*	0:10	Washington, D. C.*	11:54
Newburyport, Mass.*	3:29	Watch Hill, R. I.*	0:53
New Haven, Conn.*	3:01	West Point, N. Y.*	2:55
New London, Conn.*	1:16	Wilmington, N. C.*	0:59

# Interest Laws and Statutes of Limitations.

STATES AND TERRITORIES.	INTEREST LAWS.		STATUTES OF LIMITATIONS.		
	LEGAL RATE.	RATE ALLOWED BY CONTRACT.	JUDGMENTS, YEARS.	NOTES, YEARS.	OPEN ACC'TS YEARS.
	Per Ct.	Per Cent.			
Alabama .....	8	8	20	6	3
Arkansas .....	6	10	10	5	3
Arizona .....	10	12	5	3	2
California .....	7	Any rate	5	4	2
Colorado .....	10	Any rate	6	6	6
Connecticut .....	6	†	..	6	6
Dakota .....	7	Any rate	20	6	6
Delaware .....	6	6	20	6	3
District of Columbia .....	6	10	12	3	3
Florida .....	8	Any rate	20	5	2
Georgia .....	7	8	7	7	4
Idaho .....	10	18	6	6	3
Illinois .....	6	8	7	10	5
Indiana .....	6	8	10	10	6
Iowa .....	6	10	10	10	5
Kansas .....	7	12	5	5	2
Kentucky .....	6	8	15	15	5
Louisiana .....	5	8	10	5	3
Maine .....	6	Any rate	20	6	6
Maryland .....	6	6	12	3	3
Massachusetts .....	6	Any rate	20	6	6
Michigan .....	7	10	6	6	6
Minnesota .....	7	10	10	6	6
Mississippi .....	6	10	7	6	3
Missouri .....	6	10	20	10	5
Montana .....	10	Any rate	6	6	2
Nebraska .....	7	10	5	5	4
Nevada .....	10	Any rate	6	6	4
New Hampshire .....	6	6	20	6	6
New Jersey .....	6	6	20	6	6
New Mexico .....	6	12	15	6	4
New York .....	6	6*	20	6	6
North Carolina .....	6	8	10	3	3
Ohio .....	6	8	5	15	6
Oregon .....	8	10	10	6	1
Pennsylvania .....	6	6	5	6	6
Rhode Island .....	6	Any rate	20	6	6
South Carolina .....	7	10	10	6	6

\* New York has by a recent law legalized any rate of interest on call loans of \$5,000 or upward, on collateral security † No usury, but over six per cent. cannot be collected by law.



## Interest Laws and Statutes of Limitations.—*Concluded.*

STATES AND TERRITORIES.	INTEREST LAWS.		STATUTES OF LIMITATIONS.		
	LEGAL RATE.	RATE ALLOWED BY CONTRACT.	JUDGMENTS, YEARS.	NOTES, YEARS.	OPEN ACC'TS YEARS.
	Per Ct.	Per Cent.			
Tennessee.....	6	6	10	6	6
Texas.....	8	12	15	4	2
Utah.....	10	Any rate	5	4	2
Vermont.....	6	6	6	6	6
Virginia.....	6	8	10	5	2
Washington Territory...	10	Any rate	6	6	3
West Virginia.....	6	†	10	10	5
Wisconsin.....	7	10	20	6	6
Wyoming.....	12	Any rate	5	5	4

† No usury, but over six per cent. cannot be collected by law.

### A TRIP AROUND THE WORLD.

From Atlantic cities to Omaha, Neb., via the great trunk lines of railway—about 1,400 miles, in 2 days and 2 hours.

From Omaha to San Francisco, Cal., via Union and Central Pacific railroads—1,914, in 4 days and 6 hours.

From San Francisco to Yokohama, Japan, by Pacific Mail line of steamers—4,700 miles, in 22 days.

From Yokohama to Hong Kong, China, by Pacific Mail or Peninsular and Oriental steamers—1,600 miles, in 6 days.

From Hong Kong to Calcutta, India, by Peninsular and Oriental steamers—3,500 miles in 14 days.

From Calcutta to Bombay, India, by the East Indian and Great Indian Peninsular railways—1,450 miles, in 3 days.

From Bombay to Suez, Egypt, by Peninsular and Oriental steamers—3,600 miles, in 14 days.

From Suez to Alexandria, Egypt, by rail—225 miles, in 10 hours.

From Alexandria to Brindisi, Italy, by Peninsular and Oriental steamers—850 miles, in 3 days.

Brindisi to London, Eng., by rail, via Paris or the Rhine—1,200 miles, in 3 days.

From London to Liverpool, Eng., by railway—200 miles, in 6 hours.

From Liverpool to the Atlantic cities, America, by either of the great Atlantic steamship lines—3,000 miles, in 10 days.

Total distance, 23,639 miles. Time, 82 days. Fare, about \$1,100, with \$4 per day for meals and incidentals; the total cost of the trip, \$1,500.

# U. S. MINING LAWS.

## Valuable Information for Owners and Locators of Mines.

**W**HERE papers have once been filed with the Register and Receiver, they become a part of the record, and can neither be withdrawn nor returned, but must be transmitted to the General Land Office.

An application will be rejected when the description of the premises is erroneous or insufficient.

Application for patent will be rejected because:

1. The notice was published without the knowledge of the Register.
  2. The notice was not published in a newspaper designated as published nearest the claim.
  3. Record title was found defective ; and,
  4. A previous application had been made for the same premises, which was withdrawn pending a suit in court commenced by the adverse claimant.
- An application for patent will be rejected when the survey does not accurately define the boundaries of the claim.

Where the claim was not located in accordance with law.

Where several parties own separate and distinct portions of a claim, application for patent may be made by either for that portion of the claim owned by him ; but where several parties own undivided interests in a mining claim, all should join in an application for a patent.

A person or association may purchase as many placer locations as the local law admits; and embrace them all in one application for a patent.

Two or more lodes cannot be embraced in one application for a patent except for placer claims embracing two or more lodes within their boundaries.

Paper sworn to before any person purporting to act as a deputy for the Register and Receiver, cannot be recorded as evidence.

In all patents for mining claims situated within the interior boundaries of a town site a clause is inserted "excepting and excluding all town property, rights upon the surface, and all houses, buildings, structures, lots, blocks, streets, alleys, or other municipal improvements not belonging to the grantee herein, and all rights necessary or proper to the occupation, possession and enjoyment of the same."

Publication of notice must be made in only one newspaper for the period of sixty days.

Notice must be published ten consecutive weeks in weekly newspapers, and in daily newspapers sixty days must elapse between the first and last insertion.

Where the Register designates the daily issue of a newspaper for publication of notices of a mining application for patent, it is not a compliance with law to change to the weekly edition of the same paper, without authority of the Register.

The existence of a salt spring on a tract of land withdraws it from the operation of the homestead and pre-emption laws. A hearing for the purpose of proving the agricultural character of such lands is not allowed. Land containing valuable deposits of slate may be entered under the mining acts.

### Adverse Claims.

Adverse claimants must file a separate and distinct claim against each application which it is alleged conflicts with the premises owned by such adverse claimant.

The papers in an adverse claim once filed cannot be withdrawn, but become part of the record.

When an adverse claim has been filed it cannot be amended so as to embrace a larger portion of the premises than that described in the original adverse claim.

An adverse claim must be made out in proper form and filed in the proper local office during the period of publication of the application for the patent to be effective.

## *U. S. MINING LAWS.*

It is the duty of the adverse claimant to commence suit in proper form within the required time, and if he trusts the uncertain medium of the United States mail, he must abide the consequences, should the delay ensue through misfortune or accident. Should the failure to commence suit be the result of the corrupt or dishonest action of his attorney, the Interior Department cannot redress the wrong.

An adverse claimant should set forth in detail the facts upon which he bases his adverse claim. A statement in general terms, embodying conclusions of law, without stating the facts generally, will not be considered in evidence.

An adverse claimant should show a compliance with the local laws in recording his claim and in regard to expenditures, and shall file a copy of the original notice of his location, and show the nature or extent of the conflict alleged.

An allegation of parties to a suit that they compose the company is sufficient, and they are not required to prove that they are the original locators or the identical parties who presented the adverse claim.

### **Agricultural or Mineral Lands.**

Where land is of little if any value for agricultural purposes, but is essential to the proper development of mining claims, it should be disposed of under the Mining Act.

Where lands containing valuable mineral deposits have been included in an agricultural entry, said entry will be canceled at any time prior to issuance of patent, upon satisfactory evidence of the existence of such valuable deposits.

Where valuable deposits of mineral are discovered upon a tract after the same has been entered as agricultural, but before patent has been issued, the parties claiming the mine might make application for patent for same, and the agricultural entry will be canceled to that portion of the land embraced by said mining claim.

Where mineral deposits are discovered on agricultural lands after patent has been issued to an agricultural claimant, they pass with the patent.

Agricultural college scrip cannot be received in payment for claims.

### **Aliens.**

A foreigner may make a mining location and dispose of it, provided he becomes a citizen before disposing of the mine. Proof that the party was not a citizen before disposing of his claim must be affirmatively shown.

Locators and intermediate owners other than applicants will not be presumed aliens in the absence of allegation or objection prior to issuance of patent.

The portion of a mining claim sold to an alien cannot be patented while such owner is an alien; but on his declaration to become a citizen his right dates back to his purchase, and he may thereupon secure a United States patent for his claim.

### **Tunnels.**

There is no authority of law for a tunnel location 3,000 by 1,500 feet. A proper location is the width of the tunnel for 3,000 feet.

There is no provision of law for patenting tunnel locations, but lodes discovered in running a tunnel may be patented in like manner as other lodes.

When a lode is struck or discovered for the first time in running a tunnel, the tunnel owners have the option of recording their claim of 1,500 feet all on one side of the point of discovery or intersection, or partly on one side thereof and partly on the other.

Prospecting for blind lodes is prohibited on the line of a located tunnel, while the tunnel is in progress, but other parties are in no way debarred from prospecting for blind lodes or running tunnels, so long as they keep without the line of such tunnel.

The right is granted to tunnel owners to 1,500 feet of each blind lode not previously known to exist, which may be discovered in their tunnel.

### **Cross Ledges.**

Revised Statutes. Section 2336. Where two or more ledges cross or intersect each other, priority of title shall govern, and such prior location shall be entitled to all ore or mineral contained within the space of intersection, but the subsequent

## THE LAW OF COPYRIGHT.

location shall have the right of way through the space of intersection for the purpose of the convenient working of the mine. And where two or more veins unite, the oldest or prior location shall take the vein below the point of union, including all the space of the intersection.

## THE LAW OF COPYRIGHT.

1. A *printed* copy of the title (besides the two copies to be deposited after publication) of the book, map, chart, dramatic or musical composition, engraving, cut, print or photograph, or a *description* of the painting, drawing, chromo, statue, statuary or model or design for a work of the fine arts, for which copyright is desired, must be sent by mail or otherwise, *prepaid*, addressed "Librarian of Congress, Washington, D. C." This must be done before the publication of the book or other article. The applicant must state distinctly the name and residence of the claimant, and whether copyright is claimed as author, designer or proprietor. The *printed title* required may be a copy of the title page of such publications as have title pages. In other cases, the title must be printed expressly for copyright entry, with name of claimant of copyright. The style of type is immaterial, and the print of a typewriter will be accepted. But a separate title is required for each entry, and *each* title must be printed on paper as large as commercial note. The title of a *periodical* must include the date and number.

2. The legal fee for *recording* each copyright claim is 50 cents, and for a *copy* of this record (or certificate of copyright) an additional fee of 50 cents is required. Certificates covering more than one entry are not issued.

3. Within ten days after publication of each book or other article, two complete copies of the best edition issued must be sent, to perfect the copyright, with the address "Librarian of Congress, Washington, D. C." The postage must be prepaid, or else the publication inclosed in parcels covered by printed Penalty Labels, furnished by the Librarian, in which case they will come *FREE* by mail, without limit of weight. Without the deposit of copies above required the copyright is void, and a penalty of \$25 is incurred.

4. No copyright is valid unless notice is given by inserting in every copy published, on the title page or the page following, if it be a book; or, if a map, chart, musical composition, print, cut, engraving, photograph, painting, drawing, chromo, statue, statuary or model design intended to be perfected as a work of the fine arts, by inscribing upon some portion thereof, or on the substance on which the same is mounted, the following words, viz: "*Entered according to act of Congress, in the year—, by—, in the office of the Librarian of Congress, at Washington,*" or, at the option of the person entering the copyright, the words: "*Copyright, 18—, by—.*"

The law imposes a penalty of \$100 upon any person who has not obtained a copyright who shall insert the notice "*Entered according to act of Congress,*" or "*Copyright,*" etc., or words of the same import, in or upon any book or other article.

5. Any author may reserve the right to translate or dramatize his own work. In this case, notice should be given by printing the words "*Right of translation reserved,*" or "*All rights reserved,*" below the notice of copyright entry, and notifying the Librarian of Congress of such reservation, to be entered upon the record.

6. The original term of copyright runs for twenty-eight years. *Within six months before* the end of that time, the author or designer, or his widow or children, may secure a renewal for the further term of fourteen years, making forty-two years in all.

7. The time within which any work entered for copyright may be issued from the press is not limited by any law or regulation, but depends upon the discretion of the proprietor. A copyright may be secured for a projected work as well as for a completed one. But the law provides for no *caveat*, or notice of interference—only for actual entry of title.

8. A copyright is assignable in law by any instrument of writing, but such assignment must be recorded in the office of the Librarian of Congress within sixty

## PATENTS AND TRADEMARKS.

days from its date. The fee for this record and certificate is \$1, and for a certified copy of any record of assignment \$1.

9. A copy of the record (or duplicate certificate) of any copyright entry will be furnished, under seal, at the rate of 50 cents each.

10. In the case of books published in more than one volume, or of periodicals published in numbers, or of engravings, photographs or other articles published with variations, a copyright is to be entered for each volume or part of a book, or number of a periodical, or variety, as to style, title or inscription, of any other article. But a book published serially in a periodical, under the same general title, requires only one entry. To complete the copyright on such a work, two copies of each serial part, as well as of the complete work (if published separately), must be deposited.

11. To secure a copyright for a painting, statue, or model or design intended to be perfected as a work of the fine arts, so as to prevent infringement by copying, engraving, or vending such design, a definite description must accompany the application for copyright, and a photograph of the same, at least as large as "cabinet size," should be mailed to the Librarian of Congress within ten days from the completion of the work or design.

12. Copyrights cannot be granted upon trademarks, nor upon mere names of companies or articles, nor upon prints or labels intended to be used with any article of manufacture. If protection for such names or labels is desired, application must be made to the Patent Office.

13. Citizens or residents of the United States only are entitled to copyright.

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## THE LAW OF TRADEMARKS.

Any person, firm or corporation can obtain protection for any lawful trademark by complying with the following:

1. By causing to be recorded in the Patent office the name, residence and place of business of persons desiring the trademark.

2. The class of merchandise and description of the same.

3. A description of the trademark itself with fac-similes.

4. The length of time that the said mark has already been used.

5. By payment of the required fee—\$6.00 for labels and \$25 for trademarks.

6. By complying with such regulations as may be prescribed by the commissioner of patents.

7. A lawful trademark must consist of some arbitrary word (not the name of a person or place), indicating or not the use or nature of the thing to which it is applied; of some designation symbol, or of both said word and symbol.

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## HOW TO OBTAIN A PATENT.

Patents are issued in the name of the United States, and under the seal of the Patent Office, to any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned; and by any person who, by his own industry, genius, efforts and expense has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any

## HOW TO OBTAIN A PATENT.

new and original design for the printing of woolen, silk, cotton or other fabrics; any new and original impression, ornament, pattern, print or picture to be printed, painted, cast or otherwise placed on or worked into any article of manufacture; or any new, useful and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, or patented or described in any printed publication, upon payment of the fees required by law and other due proceedings had.

Every patent contains a grant to the patentee, his heirs or assigns, for the term of seventeen years, of the exclusive right to make, use and vend the invention or discovery throughout the United States and the Territories, referring to the specification for the particulars thereof.

If it appear that the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused on account of the invention or discovery, or any part thereof, having been known or used in any foreign country before his invention or discovery thereof, if it had not been before patented or described in any printed publication.

Joint inventors are entitled to a joint patent; neither can claim one separately. Independent inventors of distinct and independent improvements in the same machine cannot obtain a joint patent for their separate inventions; nor does the fact that one furnishes the capital and another makes the invention entitle them to make application as joint inventors; but in such case they may become joint patentees.

The receipt of letters patent from a foreign government will not prevent the inventor from obtaining a patent in the United States, unless the invention shall have been introduced into public use in the United States more than two years prior to the application. But every patent granted for an invention which has been previously patented by the same inventor in a foreign country will be so limited as to expire at the same time with the foreign patent, or, if there be more than one, at the same time with the one having the shortest unexpired term, but in no case will it be in force more than seventeen years.

### Applications.

Application for a patent must be made in writing to the Commissioner of Patents. The applicant must also file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound and use the same; and in case of a machine, he must explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions, and particularly point out and distinctly claim the part, improvement or combination which he claims as his invention or discovery. The specification and claim must be signed by the inventor and attested by two witnesses.

When the nature of the case admits of drawings, the applicant must furnish one copy signed by the inventor or his attorney in fact, and attested by two witnesses, to be filed in the Patent Office. In all cases which admit of representation by model, the applicant, if required by the Commissioner, shall furnish a model of convenient size to exhibit advantageously the several parts of his invention or discovery.

The applicant shall make oath that he verily believes himself to be the original and first inventor or discoverer of the art, machine, manufacture, composition or improvement for which he solicits a patent; that he does not know and does not believe that the same was ever before known or used, and shall state of what country he is a citizen. Such oath may be made before any person within the United States authorized by law to administer oaths, or, when the applicant resides in a foreign country, before any minister, charge d'affaires, consul or commercial agent,

## HOW TO OBTAIN A PATENT.

holding commission under the Government of the United States, or before any notary public of the foreign country in which the applicant may be.

On the filing of such application and the payment of the fees required by law, if, on such examination, it appears that the claimant is justly entitled to a patent under the law, and that the same is sufficiently useful and important, the Commissioner will issue a patent therefor.

### Assignments.

Every patent or any interest therein shall be assignable in law by an instrument in writing; and the patentee or his assigns or legal representatives may, in like manner, grant and convey an exclusive right under his patent to the whole or any specified part of the United States.

### Reissues.

A reissue is granted to the original patentee, his legal representatives, or the assignees of the entire interest when, by reason of a defective or insufficient specification, or by reason of the patentee claiming as his invention or discovery more than he had a right to claim as new, the original patent is inoperative or invalid, provided the error has arisen from inadvertence, accident or mistake, and without any fraudulent or deceptive intention. In the cases of patents issued and assigned prior to July 8, 1870, the applications for reissue may be made by the assignees; but in the cases of patents issued or assigned since that date, the applications must be made and the specifications sworn to by the inventors, if they be living.

### Caveats.

A caveat under the patent law, is a notice given to the office of the caveator's claim as inventor, in order to prevent the grant of a patent to another for the same alleged invention upon an application filed during the life of the caveat without notice to the caveator.

Any citizen of the United States who has made a new invention or discovery, and desires further time to mature the same, may, on payment of a fee of \$10, file in the Patent Office a caveat setting forth the object and the distinguishing characteristics of the invention, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof.

An alien has the same privilege, if he has resided in the United States one year next preceding the filing of his caveat, and has made oath of his intention to become a citizen.

The caveat must comprise a specification, oath, and, when the nature of the case admits of it, a drawing, and, like the application, must be limited to a single invention or improvement.

### Fees.

Fees must be paid in advance, and are as follows: On filing each original application for a patent, \$15. On issuing each original patent, \$20. In design cases: For three years and six months, \$10; for seven years, \$15; for fourteen years, \$30. On filing each caveat, \$10. On every application for the reissue of a patent, \$30. On filing each disclaimer, \$10. For certified copies of patents and other papers, including certified printed copies, 10 cents per hundred words. For recording every assignment, agreement, power of attorney or other paper, of three hundred words or under, \$1; of over three hundred and under one thousand words, \$2; of over one thousand words, \$3. For copies of drawings, the reasonable cost of making them.

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## Greatest Known Depth of the Ocean.

The greatest known depth of the ocean is midway between the islands of Tristan d'Acunha and the mouth of the Rio de la Plata. The bottom was here reached at a depth of 46,276 feet, or eight and three-fourths miles, exceeding by more than 13,000 feet the height of Mt. Hercules, the loftiest mountain in the world. The average depth of all the oceans is from 2,000 to 3,000 fathoms.

# PRINCIPAL POINTS OF CONSTITUTIONAL LAW.

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Congress must meet at least once a year.

One State cannot undo the acts of another.

Congress may admit as many new States as desired.

The Constitution guarantees every citizen a speedy trial by jury.

A State cannot exercise a power which is vested in Congress alone.

One State must respect the laws and legal decisions of another.

Congress cannot pass a law to punish a crime already committed.

U. S. Senators are chosen by the legislatures of the States by joint ballot.

Bills for revenue can originate only in the House of Representatives.

A person committing a felony in one State cannot find refuge in another.

The Constitution of the United States forbids excessive bail or cruel punishment.

Treaties with foreign countries are made by the President and ratified by the Senate.

In the U. S. Senate Rhode Island or Nevada has an equal voice with New York.

When Congress passes a bankruptcy law it annuls all the State laws on that subject.

Writing alone does not constitute treason against the United States. There must be an overt act.

Congress cannot lay any disabilities on the children of a person convicted of crime or misdemeanor.

The Territories each send a delegate to Congress, who has the right of debate, but not the right to vote.

The Vice-President, who ex-officio presides over the Senate, has no vote in that body except on a tie ballot.

An act of Congress cannot become a law over the President's veto except on a two-thirds vote of both houses.

An officer of the Government cannot accept title of nobility, order or honor without the permission of Congress.

Money lost in the mails cannot be recovered from the Government. Registering a letter does not insure its contents.

It is the House of Representatives that may impeach the President for any crime, and the Senate hears the accusation.

If the President holds a bill longer than ten days while Congress is still in session, it becomes a law without his signature.

Silver coin of denominations less than \$1 is not a legal tender.



## POINTS OF CONSTITUTIONAL LAW.

for more than \$5.00. Copper and nickel coin is not legal tender.

The term of a Congressman is two years, but a Congressman may be re-elected to as many successive terms as his constituents may wish.

Amendments to the Constitution require a two-thirds vote of each house of Congress and must be ratified by at least three-fourths of the States.

When the militia is called out in the service of the General Government, they pass out of the control of the various States under the command of the President.

The President of the United States must be 35 years of age; a U. S. Senator, 30; a Congressman, 25. The President must have been a resident of the United States fourteen years.

A grand jury is a secret tribunal, and may hear only one side of a case. It simply decides whether there is good reason to hold for trial. It consists of twenty-four men, twelve of whom may indict.

A naturalized citizen cannot become President or Vice-President of the United States. A male child born abroad of American parents has an equal chance to become President with one born on American soil.

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**CURIOUS BY-PRODUCTS FROM COAL.**—The Pittsburgh Dispatch mentions some chemical developments from coal that are new. There are a good many products from coal that the majority of the people know nothing of. Their number will go into the thousands, and research into this particular branch of inorganic chemistry is bringing new and rich rewards to scientists each year. One of the hydrocarbons distinctly produced from coal tar is benzole. This is the base of magenta red and blue coloring matters and of the oil of bitter almonds. This oil formerly came entirely from the vegetable product from which it takes its name but now it is, to a large extent, made from benzole, and a chemically pure product is secured. The vegetable oil of bitter almonds contains a certain amount of prussic acid, which is a poisonous substance. Toluene, or toluol, is another product from coal tar, which is the base of a great many chemicals. Benzoic acid, which used to be made almost entirely from plants, is now readily made from toluene. Carbolic acid is another product of toluol. The latter is a colorless fluid with a smell very much like crude petroleum, while carbolic acid and salicylic acid, two of its products, are far from being sweet-smelling compounds. Yet this same toluol is the basis of a number of very fragrant products. Wintergreen oil, much purer than from the plant, and generally preferred by confectioners and others who use it, is one; oil of cinnamon, cinnamic acid, and oil of cloves are among the middle products which are in great demand. As yet the products of coal tar have not been made use of for medicines to any great extent, except as disinfectants, but, from experiments now going on, it is hoped to produce pure quinine from chinolene, one of the coal-tar products, and scientists say that it is only a question of time when all alkaloids known, and probably others not now known, will be made from coal tar. It would take a good-sized book to even begin to give an idea of the commercial products alone of coal tar. Nearly every known color, except cochineal red and indigo blue, is made, and the latter was produced after nine years of experiment by the eminent German scientist Byer of Munich, but the manufacture was so expensive that it has never been done except for scientific purposes. The logwood and madder dyes of our grandmothers' days are rarely seen in the market now, owing to the cheapness with which they are manufactured. Red ink, which formerly was made almost exclusively from carmine, is now made from eosine, one of the numerous coal-tar progeny.

# VOTING AND NATURALIZATION.

The right to vote comes from the State, and is a State gift. Naturalization is a Federal right, and is a gift of the Union, not of any one State. In nearly one-half the Union aliens who have declared intentions vote and have the right to vote equally with naturalized or native-born citizens. In the other half only actual citizens may vote. The Federal naturalization laws apply to the whole Union alike, and provide that no alien male may be naturalized until after five years' residence. Even after five years' residence and due naturalization he is not entitled to vote unless the laws of the State confer the privilege upon him, and he may vote in one State (Minnesota) four months after landing, if he has immediately declared his intention, under United States law, to become a citizen.

## Naturalization.

The conditions under and the manner in which an alien may be admitted to become a citizen of the United States are prescribed by Sections 2165-74 of the Revised Statutes of the United States.

**DECLARATION OF INTENTION.**—The alien must declare upon oath before a Circuit or District Court of the United States, or a District or Supreme Court of the Territories, or a court of record of any of the States having common law jurisdiction, and a seal and clerk, two years at least prior to his admission, that it is, *bona fide*, his intention to become a citizen of the United States, and to renounce forever all allegiance and fidelity to any foreign prince or State, and particularly to the one of which he may be at the time a citizen or subject.

**OATH ON APPLICATION FOR ADMISSION.**—He must, at the time of his application to be admitted, declare on oath, before some one of the courts above specified, "that he will support the Constitution of the United States, and that he absolutely and entirely renounces and abjures all allegiance and fidelity to every foreign prince, potentate, State or sovereignty, and particularly, by name, to the prince, potentate, State or sovereignty of which he was before a citizen or subject," which proceedings must be recorded by the clerk of the court.

**CONDITIONS FOR CITIZENSHIP.**—If it shall appear to the satisfaction of the court to which the alien has applied that he has resided continuously within the United States for at least five years, and within the State or Territory where such court is at the time held one year at least; and that during that time "he has behaved as a man of good moral character, attached to the principles of the Constitution of the United States, and well disposed to the good order and happiness of the same," he will be admitted to citizenship.

**TITLES OF NOBILITY.**—If the applicant has borne any hereditary title or order of nobility, he must make an express renunciation of the same at the time of his application.

**SOLDIERS.**—Any alien of the age of twenty-one years and upwards, who has been in the armies of the United States and has been honorably discharged therefrom, may become a citizen on his petition, without any previous declaration of intention, provided that he has resided in the United States at least one year previous to his application, and is of good moral character.

**MINORS.**—Any alien under the age of twenty-one years who has resided in the United States three years next preceding his arriving at that age, and who has continued to reside therein to the time he may make application to be admitted a citizen thereof, may, after he arrives at the age of twenty-one years, and after has resided five years within the United States, including the three years of minority, be admitted a citizen; but he must make a declaration on oath and pr

## THE PRESIDENTIAL ELECTION.

to the satisfaction of the court that for two years next preceding it has been his *bona fide* intention to become a citizen.

**CHILDREN OF NATURALIZED CITIZENS.**—The children of persons who have been duly naturalized, being under the age of sixteen years at the time of the naturalization of their parents, shall, if dwelling in the United States, be considered as citizens thereof.

**CITIZENS' CHILDREN WHO ARE BORN ABROAD.**—The children of persons who now are or have been citizens of the United States are, though born out of the limits and jurisdiction of the United States, considered as citizens thereof.

**PROTECTION ABROAD TO NATURALIZED CITIZENS.**—Section 2000 of the Revised Statutes of the United States declares that "all naturalized citizens of the United States while in foreign countries are entitled to and shall receive from this Government the same protection of persons and property which is accorded to native-born citizens."

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### When a Man Becomes of Age.

The question sometimes arises whether a man is entitled to vote at an election held on the day preceding the twenty-first anniversary of his birth. Blackstone, in his Commentaries, book 1, page 463, says: "Full age in male or female is 21 years, which age is completed on the day preceding the anniversary of a person's birth, who, till that time, is an infant, and so styled in law." The late Chief Justice Sharswood, in his edition of Blackstone's Commentaries, quotes Christian's note on the above as follows: "If he is born on the 16th day of February, 1608, he is of age to do any legal act on the morning of the 15th of February, 1629, though he may not have lived twenty-one years by nearly forty-eight hours. The reason assigned is that in law there is no fraction of a day; and if the birth were on the last second of one day and the act on the first second of the preceding day twenty-one years after, then twenty-one years would be complete; and in the law it is the same whether a thing is done upon one moment of the day or another." The same high authority (Sharswood) adds in a note of his own: "A person is of full age the day before the twenty-first anniversary of his birthday."

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## THE PRESIDENTIAL ELECTION.

The President and Vice-President of the United States are chosen by officials termed "Electors" in each State, who are, under existing State laws, chosen by the qualified voters thereof by ballot, on the first Tuesday after the first Monday in November in every fourth year preceding the year in which the Presidential term expires.

The Constitution of the United States prescribes that each State shall "appoint," in such manner as the Legislature thereof may direct, a number of electors equal to the whole number of

## THE PRESIDENTIAL ELECTION.

Senators and Representatives to which the State may be entitled in Congress; but no Senator or Representative or person holding an office of trust or profit under the United States shall be an elector. The Constitution requires that the day when electors are chosen shall be the same throughout the United States. At the beginning of our Government most of the electors were chosen by the Legislatures of their respective States, the people having no direct participation in their choice; and one State, South Carolina, continued that practice down to the breaking out of the Civil War. But in all the States now the Presidential electors are, under the direction of State laws, chosen by the people.

The manner in which the chosen electors meet and ballot for a President and Vice-President of the United States is provided for in Article XII. of the Constitution. The same article prescribes the mode in which the Congress shall count the ballots of the electors, and announce the result.

The procedure of the two houses, in case the returns of the election of electors from any State are disputed, is provided in the "Electoral Count" Act, passed by the Forty-ninth Congress.

The Constitution defines who is eligible for President of the United States, as follows :

No person except a natural-born citizen or a citizen of the United States at the time of the adoption of this Constitution shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of 35 years.

The qualifications for Vice-President are the same.

The "Electoral Count" Act directs that the Presidential electors shall meet and give their votes on the second Monday in January next following their election. It fixes the time when Congress shall be in session to count the ballots as the second Wednesday in February succeeding the meeting of the electors.

The Presidential succession is fixed by chapter 4 of the acts of the Forty-ninth Congress, first session. In case of the removal, death, resignation or inability of both the President and Vice-President, then the Secretary of State shall act as President until the disability of the President or Vice-President is removed or a President is elected. If there be no Secretary of State, then the Secretary of the Treasury will act; and the remainder of the order of succession is: The Secretary of War, Attorney-General, Postmaster-General, Secretary of the Navy, and Secretary of the Interior. The acting President must, upon taking office, convene Congress, if not at the time in session, in extraordinary session, giving twenty days' notice.

## Qualifications of Voters in the States.

STATES.	REQUIREMENT AS TO CITIZENSHIP.	RESIDENCE IN			REGISTRATION.
		STATE	Co'TY	PRE- CINCT	
Alabama...	Citizen or declared intent..	1 y	3 m	1 m	Legis. may regulate
Arkansas...	Citizen or declared intent..	1 y	6 m	1 m	Prohib. as bar to suf
California...	Actual citizens .....	1 y	90 d	30 d	Required by law
Colorado...	Citizen or declared intent..	6 m	....	....	Req. by constitution
Connecticut	Actual citizens .....	1 y	6 m	6 m	Required by law
Delaware...	Actual county taxpayers...	1 y	1 m	....	No reg. required
Florida...	U. S. citizens or de- clared intention.....	1 y	6 m	....	Req. by constitutio
Georgia....	Actual citizens .....	1 y	6 m	....	Legis. may regulate
Illinois....	Actual citizens .....	1 y	90 d	30 d	Required by law
Indiana....	Citizen or declared intent..	6 m	60 d	30 d	No law for reg
Iowa.....	Actual citizens .....	6 m	60 d	....	Required by law
Kansas ....	Citizen or declared intent..	6 m	....	30 d	Req. in cities only
Kentucky..	Citizen or declared intent..	2 y	1 y	60 d	No reg. required
Louisiana..	Citizen or declared intent..	1 y	6 m	30 d	Legis may regulate
Maine.....	Actual citizens .....	3 m	....	....	Required by law
Maryland..	Actual citizens .....	1 y	6 m	....	Req. by constitution
Massach' tts	Citizens .....	1 y	....	6 m	Required by law
Michigan...	Citizen or declared intent..	3 m	....	10 d	Required by law
Minnesota..	Citizen or declared intent..	4 m	....	10 d	Required by law
Mississippi..	Actual citizens....	6 m	1 m	....	Req. by constitution
Missouri....	Citizen or declared intent..	1 y	60 d	....	{ Req. by constitu- tion in cities only
Nebraska..	Citizen or declared intent..	6 m	....	....	Required by law
Nevada....	Citizen or declared intent..	6 m	30 d	....	Req. by constitution
N. Ham'sh'e	Actual citizens .....	....	....	6 m	Required by law
New Jersey..	Actual citizens.....	1 y	5 m	....	Req. cities of 10,000
New York...	Actual citizens.....	1 y	4 m	30 d	Req. cities of 10,000
N. Carolina.	Actual citizens .....	1 y	90 d	....	Req. by constitution
Ohio.....	Actual citizens.....	1 y	....	....	No reg. required
Oregon....	Citizen or declared intent..	6 m	....	....	....
Pennsylv'n'a	Actual citizens .....	1 y	....	2 m	Req. by constitution
R. Island...	Actual tax-paying citizens..	1 y	....	6 m	Required by law
S. Carolina.	Actual citizens.....	1 y	60 d	....	Req. by constitution
Tennessee..	Actual citizens.....	1 y	6 m	....	No reg. required
Texas.....	Citizen or declared intent..	1 y	6 m	6 m	Prohibited
Vermont....	Actual citizens.....	1 y	....	....	Required by law
Virginia....	Actual citizens.....	1 y	....	3 m	Required by law
W. Virginia.	Actual citizens.....	1 y	60 d	....	Prohibited
Wisconsin...	Citizen or declared intent..	1 y	....	....	Required by law

State elections are held in the various States as follows: Alabama and Kentucky, first Monday in August; Arkansas, first Monday in September; Georgia, first Wednesday in October; Louisiana, Tuesday after third Monday in April; Maine, second Monday in September; Oregon, first Monday in June; Rhode Island, first Wednesday in April; Vermont, first Tuesday in September. All others are on Tuesday after first Monday in November. State Presidential elections are all on Tuesday after first Monday in November.

RODERIGO DE TRIANA was the name of the sailor with Columbus who first saw the "New World"—at 2 A. M., Oct. 12, 1492, on board the Pinta.

## THE AUSTRALIAN BALLOT SYSTEM.

What is termed the Australian Ballot System, the professed purposes of which are to secure the secrecy of the ballot and prevent the intimidation or corrupting of the voter, was practically introduced into the United States recently by its adoption by law in the State of Massachusetts and the city of Louisville, Ky. Agitation for the adoption of this plan of voting is now rife in many States.

Its substantial requirements are as follows: Ballots are to be provided at public expense; none but these ballots are to be used; on them are to be printed the names of all candidates who are nominated either by conventions or petitions a short period prior to the election; the ballots are to be distributed only by sworn ballot clerks, at the polls, to voters, and for actual and immediate use in voting; the voter is allowed five minutes in which to retire into a booth conveniently arranged, where he secretly marks his choice of candidates upon the face of the ballot, or, if he prefers, writes the names of candidates of his own nomination in place of those whose names are already printed; having done this he proceeds directly to the ballot-box, and, without exposing the face of the ballot, or communicating with any one, deposits the ballot as his vote. For the benefit of the blind and illiterate, such a voter is permitted to select one of the two ballot clerks, who, under oath of fidelity and secrecy, assists him to mark his ballot.

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## POPULAR VOTE.

For Presidential candidates from 1824 to and including 1888. Prior to 1824 electors were chosen by the Legislatures of the different States.

1824—J. Q. Adams had 105,321 to 155,872 for Jackson, 44,282 for Crawford, and 46,587 for Clay. Jackson over Adams, 50,551. Adams less than combined vote of others, 140,869. Of the whole vote Adams had 29.92 per cent., Jackson 44.27, Clay 13.23, Crawford 13.23. Adams elected by House of Representatives.

1828—Jackson had 647,231 to 509,097 for J. Q. Adams. Jackson's majority, 138,134. Of the whole vote Jackson had 55.97 per cent., Adams 44.03.

1832—Jackson had 687,502 to 530,189 for Clay, and 33,108 for Floyd and Wirt combined. Jackson's majority, 124,205. Of the whole vote Jackson had 54.96 per cent., Clay 42.39, and the others combined 2.65.

1836—Van Buren had 761,549 to 736,656, the combined vote for Harrison,

White, Webster and Maguin. Van Buren's majority, 24,893. Of the whole vote Van Buren had 50.83 per cent., and the others combined 49.17.

1840—Harrison had 1,275,017 to 1,128,702 for Van Buren, and 7,059 for Birney. Harrison's majority, 139,256. Of the whole vote Harrison had 52.89 per cent., Van Buren 46.82 and Birney .29.

1844—Polk had 1,337,243 to 1,299,068 for Clay and 62,300 for Birney. Polk over Clay, 38,175. Polk less than others combined, 24,125. Of the whole vote Polk had 49.55 per cent., Clay 48.14 and Birney 2.21.

1848—Taylor had 1,360,101 to 1,220,544 for Cass, and 291,263 for Van Buren. Taylor over Cass, 139,577. Taylor less than others combined, 151,706. Of the whole vote Taylor had 47.36 per

## Popular Vote.—*Concluded.*

- cent., Cass 42.50 and Van Buren 10.14.
- 1852—Pierce had 1,601,474 to 1,386,578 for Scott and 156,149 for Hale. Pierce over all, 58,747. Of the whole vote Pierce had 50.90 per cent., Scott 44.10 and Hale 4.97.
- 1856—Buchanan had 1,838,169 to 1,341,264 for Fremont and 874,534 for Fillmore. Buchanan over Fremont, 496,905. Buchanan less than combined vote of others, 377,629. Of the whole vote Buchanan had 45.34 per cent., Fremont 33.09 and Fillmore 21.57.
- 1860—Lincoln had 1,866,352 to 1,375,157 for Douglas, 843,763 for Breckenridge and 589,581 for Bell. Lincoln over Breckenridge, 491,195. Lincoln less than Douglas and Breckenridge combined, 354,568. Lincoln less than combined vote of all others, 944,149. Of the whole vote Lincoln had 39.91 per cent., Douglas 29.40, Breckenridge 18.08 and Bell 12.61.
- 1864—Lincoln had 2,216,067 to 1,808,725 for McClellan (eleven States not voting, viz: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia). Lincoln's majority, 408,342. Of the whole vote Lincoln had 55.06 per cent., and McClellan 44.94.
- 1868—Grant had 3,015,071 to 2,709,613 for Seymour (three States not voting, viz: Mississippi, Texas and Virginia). Grant's majority, 305,458. Of the whole vote Grant had 52.67 per cent. and Seymour 47.33.
- 1872—Grant had 3,597,070 to 2,834,079 for Greeley, 29,408 for O'Connor and 5,608 for Black. Grant's majority, 729,975. Of the whole vote Grant had 55.63 per cent., Greeley 43.83, O'Connor 15, Black .09.
- 1876—Hayes had 4,033,950 to 4,284,885 for Tilden, 81,740 for Cooper, 9,522 for Smith and 2,636 scattering. Til-

den's majority over Hayes, 250,935. Tilden's majority of the entire vote cast, 157,037. Hayes less than the combined vote of others, 344,833. Of the whole vote cast Hayes had 47.95 per cent., Tilden 50.94, Cooper .97, Smith .11, scattering .03.

1880—Garfield had 4,449,053 to 4,442,035 for Hancock, 307,300 for Weaver and 12,576 scattering. Garfield over Hancock, 7,018. Garfield less than the combined vote of others, 313,864. Of the popular vote Garfield had 48.26 per cent., Hancock 48.25, Weaver 3.33, scattering .13.

1884—Cleveland had 4,874,986 to 4,851,981 for Blaine, 150,369 for St. John, 173,370 for Butler. Cleveland had over Blaine 23,006. Cleveland had 48.48 per cent., Blaine 48.22, St. John 1.49, Butler 1.74.

1888—Harrison had 5,441,902 to 5,538,560 for Cleveland, 249,937 for Fisk, 147,521 for Streeter, 3,673 for Cowdrey, 1,591 for Curtis and 9,845 scattering. Harrison had 96,658 less than Cleveland. Of the whole vote Harrison had 47.83 per cent., Cleveland 48.63, Fisk 2.21 and Streeter 1.30.

Of the Presidents, Adams, Federalist; Polk Buchanan and Cleveland, Democrats; Taylor, Whig; Lincoln, Hayes, Garfield and Harrison, Republicans, did not, when elected, receive a majority of the popular vote. The highest percentage of popular vote received by any President was 55.97 for Jackson, Democrat, in 1828, and the lowest 39.91 for Lincoln, Republican, in 1860; Harrison, Republican, next lowest, with 47.83. Hayes and Harrison, with the exception of John Quincy Adams, who was chosen by the House of Representatives, were the only Presidents ever elected who did not have a majority over their principal competitors, and Tilden and Cleveland the only defeated candidates who had a majority over the President-elect.

**CANDLE-POWER.**—The candle-power of a light may be approximately calculated by comparing the shadow cast by a rod in the light of a standard candle, with the shadow cast by the light to be tested. By moving the latter toward or away from the rod, a point will be reached at which the shadow cast by both lights will be of the same intensity. The intensities of the two lights are directly proportional to the squares of their distances from the shadows; for example, suppose the light to be tested is three times the distance of the candle its illuminating power is nine times as great.

## THE CIVIL SERVICE.

The officials and clerks—over 120,000 in all—by whom the people's business in the administration of government is carried on, constitute the Civil Service. About 5,000 of these are appointed by the President, alone or with the consent of the Senate; about 15,000 under what are known as the "Civil Service Rules," but the great body of officeholders are appointed by heads of departments.

Those employed in the civil service have always been theoretically entitled to serve "during good behavior," but practically, until within a few years, their positions have depended upon their allegiance to the political party in power.

In 1883 Congress passed a law for the improvement of the civil service of the United States. This act provides for the appointment by the President of three commissioners to have general charge of filling the vacancies in the civil service department, and stipulates that the fitness of all applicants for all subordinate positions in the departments at Washington, and in all custom houses and postoffices having as many as 50 officeholders, shall be tested by examinations, and the positions assigned with reference to the capacity, education and character of the applicants, regardless of political preferences.

According to this, no absolute appointment to office can be made until the applicant has proven his or her ability to fill the position satisfactorily by six months' service; no person habitually using intoxicating beverages to excess shall be appointed to, or retained in, any office; no recommendation which may be given by any Senator or member of the House of Representatives, except as to character and residence, shall be considered by the examiners; men and women shall receive the same pay for the same work.

The general competitive examinations for admission to the service are limited to the following subjects: 1. Orthography, penmanship and copying. 2. Arithmetic—fundamental rules, fractions and percentage. 3. Interest, discount, and the elements of bookkeeping and of accounts. 4. Elements of the English language, letter writing, and the proper construction of sentences. 5. Elements of the geography, history and government of the U. S.

A standing of 65 per cent. in the first three branches is necessary to qualify an applicant for appointment. Where special qualifications are necessary for specific work the examinations are adapted to test the knowledge of the applicant in that particular line.

No applicant will be examined who cannot furnish proof that he is of good moral character and in good health.

There is a board of examiners in each of the principal cities of



## LAND MEASURE—PUBLIC LANDS.

the U. S., and several examinations are held each year. Applications must be made on the regular "application paper," which can be obtained of the commissioners, or any board of examiners.

Several of the States have adopted the principles laid down in the civil service act and applied them to the State civil service, and it is probably only a question of time when Civil Service Reform will be consummated throughout the U. S., and the public service will thereby be rendered much more efficient.

### United States Land Measure and Homestead Law.

A township is 36 sections, each a mile square. A section is 640 acres. A quarter section, half a mile square, is 160 acres. An eighth section, half a mile long, north and south, and a quarter of a mile wide, is 80 acres. A sixteenth section, a quarter of a mile square, is 40 acres.

The sections are all numbered 1 to 36, commencing at north-east corner, thus:

The sections are all divided in quarters, which are named by the cardinal points, as in section 1. The quarters are divided in the same way, as shown in the smaller diagram.

NW	NE	NW	NE
NW	NW	NE	NE
SW	SE	SW	SE
SW	NW	NE	NE
NW	NE	NW	NE
SW	SW	SE	SE
SW	SE	SW	SE
SW	SW	SE	SE

6	5	4	3	2	NW NE SW SE
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

The description of a forty-acre lot would read: The south half of the west half of the south-west quarter of section 1 in township 24, north of range 7 west, or as the case might be; and sometimes will fall short and sometimes overrun the number of acres it is supposed to contain.

### Titles to the Public Lands—How Acquired.

The public lands of the United States still unsold and open to settlement are divided into two classes, one class being sold by the Government for \$1.25 per acre as the minimum price, the other at \$2.50 per acre, being the alternate sections reserved by the United States in land grants to railroads, etc. Such tracts are sold upon application to the Land Register. Heads of

## STAGE FAVORITES.

families, or citizens over twenty-one years, who may settle upon any quarter section (or 160 acres) have the right under the pre-emption law of prior claim to purchase, on complying with the regulations.

Under the homestead laws, any citizen, or intending citizen, has the right to 160 acres of the \$1.25 land, or 80 acres of the \$2.50 land, after an actual settlement and cultivation of the same for five years. Under the timber culture law, any settler who has cultivated for two years as much as five acres in trees of an 80-acre homestead, or ten acres of a homestead of 160 acres, is entitled to a free patent for the land at the end of eight years.

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## STAGE FAVORITES.

The following is a carefully prepared list of stage favorites, giving the professional and private name of each: Fanny Davenport, Mrs. McDowell; Louise Pomeroy, Mrs. Arthur Elliott; Maggie Mitchell, Mrs. Henry Paddock; Rose Eytinge, Mrs. Cyril Searle; Rose Coghlan, Mrs. E. H. Edgerly; Margaret Mather, Margaret Miles; Kate Claxton, Mrs. Charles Stevenson; Effie Ellsler, Mrs. Frank Weston; Lillian Russell, Mrs. Edward Solomon; Agnes Booth, Mrs. John B. Schoeffel; Ida Mulle, Mrs. Benjamin Tuthill; Kate Castleton, Mrs. Harry Phillips; Lotta, Miss Charlotte Crabtree; Alice Atherton, Mrs. Willie Edouin; Minnie Maddern, Mrs. Le Grand White; Irene Perry, Mrs. Albert Weber; Minnie Palmer, Mrs. John R. Rogers; Marie Wainright, Mrs. Louis James; Marie Jansen, Mrs. James Barton; Laura Joyce, Mrs. Digby Bell; Minnie Conway, Mrs. Osmund Tearle; Dickie Lingard, Mrs. David Dalziell; Kittie Blanchard, Mrs. McKee Rankin; Louise Davenport, Mrs. W. E. Sheridan; Louise Thorndyke, Mrs. D. Boucicault; Agnes Robertson, Mrs. D. Boucicault; Maude Granger, Mrs. Albert Follin; Marie Prescott, Mrs. — Perzel; Caroline Hill, Mrs. Herbert Kelcey; Minnie Hauk, Mrs. G. Von Hesse Wartegg; Lily West, Mrs. Harry Brown; Ellie Wilton, Mrs. Frank Wilton; Helen Dauvray, Mrs. J. M. Ward; Fay Templeton, Mrs. Howell; Modjeska, Mme. Helena Benda; Janauschek, Mrs. E. J. Pillott; Emma Abbott, Mrs. Eugene Wetherell; Marian Elmore, Mrs. Frank Losee; Ada Gray, Mrs. Charles Watkins; Lottie Church, Mrs. John A. Stevens; Sydney Cowell, Mrs. Geo. Giddens; Annie Pixley, Mrs. Robert Fulford; Clara Morris, Mrs. F. C. Harriott; Julia Wilson, Mrs. Charles Fox; Dora Wiley, Mrs. Richard Golden; Lizzie May Ulmer, Mrs. George Ulmer; Mattie Vickers, Mrs. Charles Rogers; Theresa Vaughn, Mrs. William Mestayer; Albina de Mer, Mrs. M. B. Curtis; Alfa Norman, Mrs. Charles Byrne; Lizzie Harold, Mrs. W. S. Cornlay.

## POINTS OF CRIMINAL LAW.

You cannot lawfully condone an offense by receiving back stolen property.

The exemption of females from arrest applies only in civil, not in criminal matters.

Every man is bound to obey the call of a Sheriff for assistance in making an arrest.

The rule "Every man's house is his castle" does not hold good when a man is accused of crime.

Embezzlement can be charged only against a clerk or servant, or the officer or agent of a corporation.

Bigamy cannot be proven in law if one party to a marriage has been absent and not heard from for five years.

Grand larceny is when the value of property stolen exceeds \$25.00—when less than that, the offense is petit larceny.

Arson to be in the first degree must have been committed at night and the buildings fired must have been inhabited.

Drunkenness is not a legal excuse for crime, but delirium tremens is considered by the law as a species of insanity.

In a case of assault it is only necessary to prove an "offer or attempt at assault." Battery presumes physical violence.

Mayhem, although popularly supposed to refer to injury to the face, lip, tongue, eye, or ear, applies to any injury done a limb.

A felony is a crime punishable by imprisonment in a State prison; an "infamous" crime is one punishable with death or State prison.

A police officer is not authorized to make an arrest without a warrant unless he has personal knowledge of the offense for which the arrest is made.

An accident is not a crime, unless criminal carelessness can be proven. A man shooting at a burglar and killing a member of his family is not a murderer.

Burglary in the first degree can be committed only in the night time. Twilight, if dark enough to prevent distinguishing a man's face, is the same as "night" in law.

Murder to be in the first degree must be willful, premeditated and malicious, or committed while the murderer is engaged in a felonious act. The killing of a man in a duel is murder, and it is a misdemeanor to accept or give a challenge.

False swearing is perjury in law only when willfully done, and when the oath has been legally administered. Such qualifying expressions as "to the best of my belief," "as I am informed," may save an averment from being perjured. The law is that the false statement sworn to must be absolute. Subornation of perjury is a felony.

# THE TARIFF.

## Condensed List of U. S. Customs Duties.

Animals for breeding purposes .....	{ free on Consular Certificate.
“ otherwise .....	20 per cent.
Ale, Porter, and Beer in bottles .....	35 cts. per gallon.
“ “ “ in casks .....	20 cts. per gallon.
Books, Charts, new .....	25 per cent.
“ “ for Colleges, Libraries, or printed more than 20 years, or in use abroad more than 1 year, and not for sale .....	free.
Boots, Shoes, articles of Leather .....	30 per cent.
Bronze, Manufactures of .....	45 per cent.
Carpets, Aubusson, Axminster and all woven whole for room .....	{ 45 cts. per sq. yd. and 30 per cent.
“ Brussels Tapestry, printed on the warp or otherwise .....	{ 30 cts. per sq. yd. and 30 per cent.
“ Brussels, wrought by the Jacquard machine .....	{ 44 cts. per sq. yd. and 35 per cent.
“ Saxony, Wilton and Tournay Velvet wrought by Jacquard machine .....	{ 45 cts. per sq. yd. and 30 per cent.
“ Treble Ingrain, three-ply and Worsted China Venetian .....	{ 12 cts. per sq. yd. and 30 per cent.
“ Velvet, Patent or Tapestry, printed on the warp or otherwise .....	{ 25 cts. per sq. yd. and 30 per cent.
Carriages .....	35 per cent.
China—Porcelain and Parian Ware, plain .....	55 per cent.
“ gilded, ornamented or decorated .....	60 per cent.
Cigars, Cheroots and Cigarettes .....	{ \$2.50 per lb. and 25 per cent.
Clocks, and parts of .....	30 per cent.
Clothing, wholly or in part wool .....	{ 35 cts. per lb. and 35 per cent.
“ Linen .....	40 per cent.
“ Silk component .....	50 per cent.
“ All other descriptions .....	35 per cent.
Coal, Bituminous .....	75 cts. per ton.
Cutlery, Table, etc. ....	35 per cent.
“ Pen, Jack and Pocket Knives .....	50 per cent.
Diamonds, unset .....	10 per cent.
Engravings .....	25 per cent.
Furniture .....	35 per cent.
Furs, manufactured .....	30 per cent.
Gilt and Plated Ware, etc. ....	35 per cent.
Glass Ware .....	45 per cent.

## THE TARIFF.

Gloves, Kid .....	50 per cent.
Gold and Silver Ware, etc. ....	45 per cent.
Guns, Rifles, Muskets. ....	25 per cent.
" Sporting .....	35 per cent.
Hats and Bonnets of all kinds except wool .....	30 per cent.
Hay .....	\$2 per ton.
Iron, Pig and Scrap .....	\$6.72 per ton.
" Manufactures of .....	45 per cent.
Jewelry, Gold, Silver or Imitation .....	25 per cent.
" Jet and Imitations of .....	25 per cent.
Laces, Silk, and Silk and Cotton .....	50 per cent.
" Thread .....	35 per cent.
Linen—Table, Towelling, etc. ....	35 per cent.
Machinery, Brass or Iron .....	45 per cent.
" Copper or Steel .....	45 per cent.
Musical Instruments .....	25 per cent.
Oils—Animal and Olive .....	25 per cent.
" Castor .....	80 cts. per gal.
Paintings .....	30 per cent.
" If work of an American artist ...	free.
" Frames for ditto .....	30 per cent.
Photographs .....	25 per cent.
Pipes—Meerscham, Wood and of all other material except Common Clay (35 per cent.) .....	70 per cent. -
Prints or Engravings .....	25 per cent.
Rubber Boots, Shoes and other articles wholly of Rubber (not fabrics) .....	25 per cent.
" Braces, Suspenders, Webbing, etc., unless in part silk .....	30 per cent.
" Silk, cotton, worsted or leather ....	50 per cent.
Saddles and Harness .....	35 per cent.
Shawls—Silk .....	50 per cent.
" Camel's Hair or other Wool .....	{ 35 cents per lb. and 40 per cent.
Silk—Dress and Piece .....	50 per cent.
Skins, Dressed .....	20 per cent.
Snuff .....	50 cts. per lb.
Soap—Castile .....	20 cts. per lb.
" Fancy, Perfumed, Toilet and Wind- sor .....	15 cts. per lb.
Statuary, Marble .....	30 per cent.
Stereoscopic Views on glass or paper .....	{ 40 and 25 per cent. respectively.
Spirits—Brandy, Whiskey, Gin, etc. ....	\$2 per proof gal.

## THE FREE LIST.

Toys.....	35 per cent.
Umbrellas—Silk or Alpaca.....	50 per cent.
Velvet—Silk.....	50 per cent.
“ Cotton or mostly cotton.....	40 per cent.
Watches.....	25 per cent.
Wines—All <i>still</i> Wines, such as Sherry, Claret or Hock, in casks.....	50 cts. per gal.
Ditto per case of 12 bottles.....	\$1.60 per case.
All Champagnes and Sparkling Wines in cases of 1 doz. quarts or 2 doz. pints.....	\$7 per case. (and bottles extra, 3 cts. each.)

### THE FREE LIST.—Articles Free of Duty.

Actors' Costumes and Effects intended for personal use.	Household effects in use abroad over one year, and not for sale.
Animals for breeding pur- poses.	India Rubber, Crude.
Antiquities not for sale.	Instruments, professional, in use.
Articles and Tools of Trade.	Macaroni and Vermicelli.
Art Works of American Art- Bed Feathers. [ists.	Mineral Waters, Natural.
Birds, Land and Water Fowl.	Mother of Pearl, Unmanufac- tured.
Books printed over 20 years.	Natural History Specimens (not for sale).
Bullion, Gold and Silver.	Newspapers.
Coal, Anthracite.	Periodicals.
Cocoa, Crude.	Personal effects when old and in use over one year.*
Coffee.	Plants, Trees and Shrubs.
Collections of Antiquities, etc., for use in Colleges, Mu- seums, Incorporated Socie- ties, etc.	Rags, not wool, for paper stock.
Diamonds, Rough. [ties, etc.	Sausages, Bologna, German, Skins.
Drugs, Crude, used in Dyeing or Tanning.	Scientific Instruments for Col- Skins, Raw. [leges.
Effects of American Citizens dying abroad, if accompa- nied by Consular Certificate.	Tapioca.
Engravings (engraved over 20 years. [yrs.	Tea.
Fertilizers.	United States Manufactures forwarded to Foreign Coun- tries and returned.
Fruits and Nuts, green, ripe, Furs, Undressed. [dried.	Wax, Vegetable and Mineral.
Hides, Raw.	

\* NOTE.—Personal effects, when old and in use *over one year*, can be entered free, provided they accompany the owners, or the owners can take oath that they have arrived in the United States within *one year* prior to the date of

## BOVINES VS. EQUINES.

arrival of the goods, specifying steamer and date upon which they arrived. If the owners have not arrived within the year, duty must be paid on appraisement. Household effects, books and libraries, if used abroad *not less* than one year, and not intended for any other person, nor for sale, are entitled to *free entry*, even if the owners have resided *more than one year* in the United States. Old clothing and household effects sent as presents are dutiable. Paintings, statuary and other works are embraced in the term "household effects." Horses, carriages and saddlery are now embraced in the term "household effects." Duty must be paid on all watches but *one* brought by a single passenger. Each passenger is entitled to bring with him fifty cigars. If above that quantity, they are liable to duty or seizure, as the case may arise.

**BOVINES VS. EQUINES.**—The differences anatomically and physiologically between the cattle tribe (*Bos*) and the horse family (*Equus*) is an interesting study. In parallel tables these can be seen at a glance. They have been condensed with a view of bringing the whole matter into a nutshell, so they may be understood at a glance:

CATTLE—	HORSES—
Have two toes.....	Have one toe.
Horned.....	Without horns.
Have no mane.....	Have flowing mane.
Long hair in a tuft at end of tail.....	Tail covered with long hair.
Pawing with fore-feet denotes anger.....	Pawing with fore-feet denotes hunger.
Seize forage with the tongue.....	Gather food with the lips.
Lips slightly movable.....	Lips very movable.
Have no upper incisor teeth.....	Have upper and lower incisors.
Lie down fore parts first.....	Lie down hind parts first.
Rise on hind-legs first.....	Rise on fore-legs first.
Four stomachs.....	One stomach.
They chew the cud.....	Do not chew the cud.
Have gall bladder.....	Have no gall bladder.
Mouth generally open when wearied.....	Mouth never open from exhaustion.
Defense by goring.....	Defense by kicking.
Bellow or moo.....	Neigh or whinny.
Do not sweat.....	Perspire easily.
Have dewlap.....	Have no dewlap.
No warts on inside of hind-legs.....	Hard, oval warts inside hind-legs.
Never use teeth in fighting.....	Use the teeth in fighting.
Do not retract the ears.....	Retract the ears when angry.
Very rough tongue.....	Soft, smooth tongue.
Short, broad head.....	Long, narrow head.
Wide, drooping ears.....	Erect, narrow ears.
Limbs formed for strength.....	Limbs formed for speed.
Do not roll in the dust.....	Do roll in the dust.
Sleep with both ears alike.....	Sleep with one ear forward.
Lie down to sleep.....	Often sleep standing.
Eat and lie down to ruminate.....	Never ruminate. Eat little and often.
Shoulders straight.....	Shoulders sloping.

**MONARCHS AND THEIR END.**—The world has had 2,550 kings or emperors of whom records are known, and who have reigned over seventy-four peoples. Of these rulers, 300 were overthrown, sixty-four were forced to abdicate, twenty-eight committed suicide, twenty-three became mad or imbecile, 100 were killed in battle, 123 were captured by the enemy, twenty-five were tortured to death, 151 were assassinated, and 108 were executed.

# STOCK INVESTMENTS EXPLAINED.

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**T**HE CAPITAL of corporations is always divided into shares, usually of \$100 each. These are known as *stock*, and represent an interest in the property and profits of the company. A *dividend* is the distribution of the profits, proportionate to number of shares held among the stockholders. *Stock certificates* are written instruments, signed by the proper officers of the company, and certifying that the holder is the owner of a certain number of shares. These are transferable, and may be bought and sold the same as other property. The sum for which each share or certificate was issued is the *par value*, and the amount for which it can be sold the *market value*.

**PREFERRED STOCK** takes preference of the ordinary stock of a corporation, and the holders are entitled to a stated per cent. annually out of net earnings before a dividend can be declared on common stock. Preferred stocks are generally the result of reorganization, although sometimes issued in payment of floating or unsecured debts.

**WATERING STOCK.**—Sometimes the charter of a corporation forbids the declaring of a dividend exceeding a certain per cent. of the par value of its stock. In this case the directors may find it desirable to “water” the stock—that is, issue additional shares. This increase in the number of shares of course reduces the percentage of dividend, although the same profit in the aggregate is secured to the stockholders.

## Dealing in Stocks.

The person employing a broker to buy the stock is required to advance at the outset a certain per cent. of the purchase price of the stock, as security for possible losses by reason of a decline of the stock while in the broker's hands. The amount of the margin required is generally 10 per cent., but may be more or less, and frequently is nothing at all, depending on the broker's confidence in his customer's readiness to meet losses, if there be any.

The broker then goes into the stock exchange and buys of some selling broker the stock indicated, the buying broker himself advancing the purchase money.

The relation existing between the customer and the broker in a transaction of this kind may be briefly stated as follows:

The broker agrees: 1. That he will buy for his customer the stock indicated, at its market value. 2. That he will hold the stock for the benefit of his customer so long as the necessary margin is advanced, and kept paid, or until notice is given by either party that the transaction must be closed. 3. That he will at all times have the stock in his possession or under his control; or an equal amount of other shares of the same stock, sub-



## STOCKS AND BONDS.

ject to the call of the customer. 4. That he will sell the shares on the order of the customer, on payment to him of the purchase price advanced by the broker, accounting to the customer for the proceeds of the sale. 5. That he will exercise proper care and competent skill in the services which he undertakes to perform.

The customer agrees: 1. To pay the margin called for at the outset. 2. To keep good such margin according to the fluctuation of the market. 3. To take the stock purchased by his order when requested to do so by the broker, paying the latter the difference between the margin advanced and the sum paid for the stock by the broker, together with his commissions for doing the business.

Although the broker's money bought the stock, it belongs to the customer, together with all its earnings and dividends, while in the broker's possession, and the customer is entitled to the possession of the stock on payment to the broker of the sum of money to which he is entitled.

The broker may pledge the stock, or use it in his business, as collateral, but he must have it ready when called for by the customer, or other shares of the same stock equivalent in value.

The customer and the broker may make an express agreement that the broker may sell the stock without notice to the customer in the case of a threatened decline.

Generally speaking, when there are no directions as to selling, the broker will be protected if he can show that he followed the usual custom of brokers in like circumstances.

If the customer fails to advance the necessary margin when called for on reasonable notice, the broker may sell for his own protection.

The reasonable notice may be an hour, a day, or a week, depending on the condition of the market for that particular stock.

If a broker fraudulently converts the stock to his own use, he is guilty of embezzlement.

## Bonds.

A *bond* is in the nature of a promissory note—the obligation of a corporation, state, county or city to pay a certain sum of money at a certain time, with interest payable at fixed periods or upon certain conditions.

The bond of a company may be a perfectly safe investment, when the stock is not; and the stock of a prosperous and successful company, paying large dividends or having a large surplus, may sell at a higher price than the bonds of the same company, the income from which is limited to the agreed rate of interest which they bear. A much closer scrutiny should be made

## BROKERAGE AND COMMISSION.

of a company's standing when one thinks of investing in its share capital, than when it is the intention to loan the company money on its mortgage bonds.

Generally the bonds of business corporations are secured by mortgage, but some classes of bonds are dependent on the solvency or good faith of the company issuing them.

The *coupons* attached to bonds represent the different installments of interest, and are to be cut off and collected from time to time as the interest becomes payable. Bonds are sometimes issued without coupons, and are then called *registered bonds*. Such bonds are payable only to the registered owner, and the interest on these is paid by check. *Convertible bonds* are such as contain provisions whereby they may be exchanged for stock, lands or other property.

Bonds are known as First Mortgage, Second Mortgage, etc., Debentures, Consols, Convertible Land Grant, Sinking Fund, Adjustment, Income or otherwise, according to their priority of lien, the class of property upon which they are secured, etc. Income bonds are generally bonds on which the interest is only payable if earned, and ordinarily are not secured by mortgage. Bonds are also named from the rate of interest they bear, or from the dates at which they are payable or redeemable, or from both; as, U. S. 4's 1907, Virginia 6's Western Union 7's, coupon, 1900, Lake Shore reg. 2d, 1903.

### Brokerage and Commission.

A commission merchant, or factor, is an agent intrusted by his principal with goods to be sold, with the authority to deduct from the proceeds of the sales a certain sum agreed upon as compensation for his services, remitting the balance to his principal.

Such an agent impliedly agrees to perform his duties in a careful and diligent manner, and to obey the orders and instructions which he receives from his principal so far as he is able.

He is bound to exercise his judgment and discretion to the best advantage of his principal, and to render just and true accounts.

In the absence of special instructions to the contrary, he has an implied authority to sell at such times, and at such prices, as in the exercise of his discretion he may deem for the best interests of his principal.

He may sell on credit, if it is customary so to do, among those in the same business, unless he has received orders to the contrary.

All profits made by him in handling his principal's property or money, beyond his ordinary compensation, are for the benefit of the principal.

He cannot himself be the purchaser of the goods intrusted to

## TERMS USED ON 'CHANGE.

him to sell, unless he deals openly and fairly with his principal, and acquaints him with all the facts and circumstances material for him to know.

### Bankruptcy.

Laws have been enacted in nearly all the States for the purpose of distributing the property of an insolvent debtor ratably among his creditors and discharging the debtor from further liability. Proceedings may be instituted by the debtor himself or by a creditor. As a general rule, proceedings in one State are not binding on a creditor residing in another State; but if Congress were to pass a national bankrupt law, this would annul all State laws on the subject, and proceedings under the national law would bind creditors in all the States and Territories.

Insolvency proceedings are generally commenced by a petition to the Judges of the court of insolvency, setting forth among other things the debtor's inability to pay all his debts in full, and his desire to surrender all his property for the benefit of his creditors.

If satisfied of the truth of matters alleged in the petition, the judge issues an order commanding the proper officer to take the debtor's property and hold it until a certain time, when the creditors meet and choose an assignee.

The assignee then takes charge of the property, turns it into money, and declares a dividend for the creditors.

Pending the proceedings, the debtor may be examined on oath for the purpose of making him disclose all matters concerning his property and the disposal thereof.

If the debtor has conformed to the insolvent law in all respects, he is entitled to a discharge from his debts, which is given him by the judge on the debtor's obtaining the requisite assent from the creditors.

In nearly all the States an insolvent debtor may, with the consent of his creditors, and in some States without such consent, assign all his property to a trustee for the benefit of his creditors, who converts it into money, dividing it *pro rata* among the creditors.

### Terms Used on 'Change.

**ACCOMMODATION PAPER.**—Notes or bills not representing an actual sale or trade transaction, but merely drawn to be discounted for the benefit of drawer, acceptor or indorsers, or all combined.

**BALANCE OF TRADE.**—Difference in value between total imports and exports of a country.

**BALLOONING.**—To work up a stock far beyond its intrinsic worth by favorable stories or fictitious sales.

**BEAR.**—One who strives to depress the price of stocks, etc., and for this reason "goes short."

**BUYING LONG.**—Buying in expectation of a rise.

**BREADSTUFFS.**—Any kind of grain, corn or meal.

## THE INTER-STATE COMMERCE LAW.

**BROKER.**—An agent or factor; a middleman paid by commission.

**BROKERAGE.**—A percentage for the purchase or sale of money and stocks.

**BULL.**—A broker or dealer who believes that the value of stocks or breadstuffs will rise, and speculates for a rise.

**CALL.**—Demand for payment of installments due on stocks.

**CALL.**—A privilege given to another to "call" for delivery at a time and price fixed.

**CLIQUE.**—A combination of operators controlling large capital in order to unduly expand or break down the market.

**COLLATERALS.**—Any kind of values given in pawn when money is borrowed.

**CORNERS.**—The buying up of a large quantity of stocks or grain to raise the price. When the market is oversold, the shorts, if compelled to deliver, find themselves in a "corner."

**CURBSTONE BROKERS.**—Brokers or agents who are not members of any regular organization, and do business mainly on the sidewalk.

**DELIVERY.**—When stock or grain is brought to the buyer in exact accordance with the rules of the Exchange, it is called a good delivery. When there are irregularities, the delivery is pronounced bad, and the buyer can appeal to the Exchange.

**DIFFERENCE.**—The price at which a stock is bargained for and the rate or day of delivery are not usually the same, the variation being termed the difference.

**FACTOR.**—An agent appointed to sell goods on commission

**FACTORAGE.**—Commissions allowed factors.

**FLAT.**—Inactive; depressed; dull. The *flat* value of bonds and stocks is the value without interest.

**FLYER.**—A small side operation, not employing one's whole capital.

**FORCING QUOTATIONS** is where brokers wish to keep up the price of a stock and to prevent its falling out of sight. This is generally accomplished by a small sale.

**GUNNING** a stock is to use every art to produce a break when it is known that a certain house is heavily supplied and would be unable to resist an attack.

**KITE-FLYING.**—Expanding one's credit beyond wholesome limits.

**LAME DUCK.**—Stock-brokers' slang for one unable to meet his liabilities.

**LONG.**—One is *long* when he carries stock or grain for a rise.

**POINTER.**—A theory or fact regarding the market on which one bases a speculation.

**POOL.**—The stock or money contributed by a clique to carry through a corner.

**PRICE CURRENT.**—The prevailing price of merchandise, stock or securities.

**SELLING SHORT.**—To "sell short" is to sell for future delivery what one has not got, in hopes that prices will fall.

**WATERING** a stock is the art of doubling the quantity of stock without improving its quality.

## THE INTER-STATE COMMERCE LAW.

The Inter-State Commerce Act is a law passed by Congress in 1887, for the regulation of rates and the management of inter-State commerce. It applies to carriers engaged in the transportation of passengers or property wholly by railroad or partly by railroad and partly by water, from one State, Territory or District of the United States to any other State, Territory or District, or to or from a foreign country. It provides for the appointment of a board of five commissioners, empowered to enquire into the management of the carriers and determine the reasonableness of their rates. A carrier whose line is entirely within a State is subject to the act so far as it makes or accepts through rates on inter-State commerce.

Among other things the act requires that all charges shall be just and reasonable; that charges for a shorter distance shall not

## THE LAWS OF CHANCE.

exceed those for a longer distance on the same line in the same direction, when the circumstances and conditions are similar; that there shall be no unjust discrimination as between persons or classes of traffic or localities, in the charges made or in the service rendered; that the rates charged for transportation shall be printed, filed with the Commission and kept for public inspection at the several stations, and that the carriers shall annually make a complete exhibit of their business to the Commission.

The act makes exceptions from its provisions of the carriage of property for the United States or for any State or municipal government, or for charitable purposes, or to or from fairs and expositions, and it allows of the issuing of mileage, excursion or commutation tickets, and admits of the giving of reduced rates to ministers of religion and free transportation to the officers and employes of the carrier, and to the principal officers of other carriers.

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THE LAWS OF CHANCE.—Card-players who are continually bemoaning their ill-luck of always receiving the same poor cards, will, perhaps, be reassured by knowing that the fifty-two cards, with thirteen to each of the four players, can be distributed in 53,644,737,756,488,792,839,237,440,000 different ways, so that there would still be a good stock of combinations to draw from, even if a man from Adam's time had devoted himself to no other occupation than that of playing at cards.

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THE PLACE WHERE THE SUN JUMPS A DAY.—Chatham Island, lying off the coast of New Zealand, in the South Pacific Ocean, is peculiarly situated, as it is one of the habitable points of the globe where the day of the week changes. It is just in the line of demarkation between dates. There, at high 12 Sunday, noon ceases, and instantly Monday meridian begins. Sunday comes into a man's house on the east side and becomes Monday by the time it passes out the western door. A man sits down to his noonday dinner on Sunday, and it is Monday noon before he finishes it. There Saturday is Sunday and Sunday is Monday, and Monday becomes suddenly transferred into Tuesday. It is a good place for people who have lost much time, for by taking an early start they can always get a day ahead on Chatham Island. It took philosophers and geographers a long time to settle the puzzle of where Sunday noon ceased and Monday noon began with a man traveling west fifteen degrees an hour, or with the sun. It is to be hoped that the next English arctic expedition will settle the other mooted question: "Where will one stop who travels northwest continually?"

# INSURANCE.

**A** *STOCK Insurance Company* is one whose capital is owned by stockholders, they alone sharing the profits and they alone being liable for losses. The business of such a company, and also of a mixed company, is managed by directors chosen by the stockholders. Policy-holders, unless at the same time stockholders, have no voice in the management of the company's business or in the election of its officers.

*A Mutual Insurance Company* is one in which the profits and losses are shared among the policy-holders (the insured.)

*Mixed Companies* are a combination of the foregoing. In a mixed company all profits above a certain fixed dividend are usually divided among the policy-holders.

Some mutual and mixed companies issue what are called *non-participating policies*. The holders of these do not share in the profits or losses.

## FIRE INSURANCE.

Policies for fire insurance are generally issued for a period of one to five years. Ordinarily, in case of loss by fire, the insured will be paid the extent of his loss up to the amount of insurance, unless the insurance company prefer to replace or repair the damaged property, which privilege is usually reserved. If the policy contains the "average clause" the payment will cover only such portion of the loss as the amount of insurance bears to the value of the property insured.

*A Floating Policy* is one which covers property stored in several buildings or places. The name is applied more particularly to policies which cover goods whose location may be changed in process of manufacture, or in the ordinary course of business. The "average clause" is a usual condition of policies of this class.

*Short Rates* are rates for a term less than a year. If an insurance policy is terminated at the request of the policy-holder, the company retains the customary "short rates" for the time the policy has been in force, as shown by the following tables:

Policy for 1 year.	Policy for 2 years.	Policy for 3 years.	Policy for 4 years.	Policy for 5 years.	Charge this proportion of whole Premium.
1 mo.	2 mo.	3 mo.	4 mo.	5 mo.	20 per cent.
2 "	4 "	6 "	8 "	10 "	30 "
3 "	6 "	9 "	12 "	15 "	40 "
4 "	8 "	12 "	16 "	20 "	50 "
5 "	10 "	15 "	20 "	25 "	60 "
6 "	12 "	18 "	24 "	30 "	70 "
7 "	14 "	21 "	28 "	35 "	75 "
8 "	16 "	24 "	32 "	40 "	80 "
9 "	18 "	27 "	36 "	45 "	85 "
10 "	20 "	30 "	40 "	50 "	90 "
11 "	22 "	33 "	44 "	55 "	95 "

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## INSURANCE.

When a policy is terminated at the option of the company, a ratable portion of the premium is refunded for the unexpired term.

### LIFE INSURANCE.

In ordinary life policies a certain premium is to be paid every year until the death of the insured, when the policy becomes payable to the beneficiary. There are other kinds of policies, however, and these are described below:

*Limited Payment Life Policy*—Conditions: Premiums to be paid annually for a certain fixed number of years, or until the death of the insured, should that occur prior to the expiration of this period. Policy payable at death of the insured. Advantages: Payments on this kind of policy may all be made while the insured is best able to make them, and, if he live to an old age, the policy will not be a continual burden, but will rather be a source of income, as the yearly dividends may be taken out in cash or added to the amount of insurance.

*Term Life Policy*.—In this method of insurance, the insurance company agrees to pay to the beneficiaries a certain sum on the death of the insured, should that event occur within a fixed term.

*Endowment Policy*—A combination of a Term Life Policy and a Pure Endowment. These policies are issued for endowment periods of 10, 15, 20, 25, 30 or 35 years, and may be paid up by a single payment, by an annual premium during the endowment period, or by five or ten annual payments. Conditions: 1. Insurance during a stipulated period, payable at the death of the insured, should that event happen within said period. 2. An endowment of the same amount as the policy, payable to the insured, if still living at the end of the period fixed. Advantages: Limited term of payments; insurance during the time when the death of the insured would cause most embarrassment to his family; provision for old age, as the amount of the policy will be paid to the insured if still living, at a time when advanced age may make it of great benefit.

*Annuity Policies* are secured by a single cash payment and insure the holder the yearly payment of a certain sum of money during life.

*Joint Life Policy*.—An agreement to pay a certain sum on the death of any one of two or more persons thus insured.

*Non-forfeiting Policies* do not become void for non-payment of premiums. In some companies all limited payment life policies, and all endowment policies, after premiums for three (or two) years have been paid, and the original policy is surrendered within a certain time, provide for paid-up assurance for as many parts of the original amount assured as there shall have been complete annual premiums received in cash by the company. Some companies voluntarily apply all credited dividends to the continuance of the insurance. Others apply the legal reserve to the purchase of term insurance at regular rates.

*Special Forms*.—The Reserve Endowment, Tontine Investment and other special policies guarantee to the holder a definite surrender value at the termination of certain periods. The surrender value of a policy is the amount in cash which the company will pay the holder of a policy on its surrender—the legal reserve less a certain per cent. for expenses.

*The Reserve* of life insurance policies is the present value of the amount to be paid at death less the present value of all the net premiums to be paid in the future.

*The Reserve Fund* of a life insurance company is that sum in hand which, invested at a given rate of interest, together with future premiums on existing policies, should be sufficient to meet all obligations as they become due. It is the sum of the separate reserves of the several policies outstanding.

*The Expectation of Life* is the number of years which one

## INSURANCE.

may probably live. This average number of years has been determined from the experience of insurance companies.

Age.	Expecta- tion in years.	Age.	Expecta- tion in years.	Age.	Expecta- tion in years.	Age.	Expecta- tion in years.	Age.	Expecta- tion in years.
0	28.15	20	34.22	40	26.04	60	15.45	80	5.85
1	36.78	21	33.84	41	25.61	61	14.86	81	5.50
2	38.74	22	33.46	42	25.19	62	14.26	82	5.16
3	40.01	23	33.08	43	24.77	63	13.66	83	4.87
4	40.73	24	32.70	44	24.35	64	13.05	84	4.66
5	40.88	25	32.33	45	23.92	65	12.43	85	4.57
6	40.69	26	31.93	46	23.37	66	11.96	86	4.21
7	40.47	27	31.50	47	22.83	67	11.48	87	3.90
8	40.14	28	31.08	48	22.27	68	11.01	88	3.67
9	39.72	29	30.66	49	21.72	69	10.50	89	3.56
10	39.23	30	30.25	50	21.17	70	10.06	90	3.43
11	38.64	31	29.83	51	20.61	71	9.60	91	3.32
12	38.02	32	29.43	52	20.05	72	9.14	92	3.12
13	37.41	33	29.02	53	19.49	73	8.69	93	2.40
14	36.79	34	28.62	54	18.92	74	8.25	94	1.98
15	36.17	35	28.22	55	18.35	75	7.83	95	1.62
16	35.66	36	27.78	56	17.78	76	7.40		
17	35.37	37	27.34	57	17.20	77	6.99		
18	34.98	38	26.91	58	16.63	78	6.59		
19	34.59	39	26.47	59	16.04	79	6.21		

### MARINE AND TRANSIT INSURANCE.

Insurance of vessels and their cargoes against the perils of navigation is termed *Marine Insurance*.

*Inland and Transit Insurance* refer to insurance of merchandise while being transported from place to place either by rail or water routes, or both.

*Insurance Certificates*, showing that certain property has been insured and stating the amount of the insurance and the name of the party abroad who is authorized to make the settlement, are issued by marine companies. They are negotiable and are usually sent to the consignee of the merchandise to make the loss payable at the port of destination.

The adjustment of marine policies in case of loss is on the same principle as the adjustment of fire policies containing the "average clause."

*Open Policies* are such upon which additional insurances may be entered at different times.

NUMBER of families in the United States (census of 1880), 9,945,916; average number to a square mile, 3.43. Number of dwellings, 8,955,842; average to the square mile, 3.02. Number of acres to a family, 186.62. Number of persons to a family, 5.04. Number of persons to a dwelling, 5.6.

NUMBER of farms in the United States in 1880, 4,008,907; in 1870, 2,659,985; in 1860, 2,044,077; in 1850, 1,449,073.



## INTERNAL REVENUE.

The internal revenue of the U. S. includes the taxes on spirits, tobacco, etc., and most of the receipts from national taxes, except customs duties and the receipts from the sale of public lands, patent fees, postal receipts, etc.

The Constitution declares that Congress has the power "to lay and collect taxes, duties, imports and excises," and that they shall be uniform throughout the U. S., and provides that direct taxes shall be apportioned among the States only in proportion to the population.

At the close of the revolution raising money by internal taxation was hardly thought of, and at that time the condition of the people and manufactures would not warrant it. The first internal revenue tax imposed by Congress was that of March 3, 1791, on distilled spirits of domestic manufacture, the enforcement of which led to the whiskey insurrection. In 1798 the first direct tax of the kind, one of \$2,000,000, was apportioned among the States, and it was proposed that it should be levied on dwelling-houses, slaves and land.

All internal taxes were repealed in 1802 in accordance with the recommendation of President Jefferson, and no others were authorized until 1813, when the war with England necessitated an increased revenue. These taxes were continued a few years after the war, but were abolished, and none were levied until 1861.

The civil war forced a renewal of the internal revenue system, and in 1861 a direct tax of \$20,000,000 was apportioned among the States. On July 1, 1862, an act was passed levying taxes on all sorts and kinds of articles too numerous to mention. A few industries were taxed out of existence, and all were more or less disturbed, but the people submitted without opposition. Great reductions were made after the war ceased, and at the present time the only subjects of internal revenue taxation are tobacco, spirits, fermented liquors, bank circulation and oleomargarine.

The following have always been exempt from taxation in the U. S.:

Public property of both State and nation; the property of incorporated institutions of learning; houses of worship; cemeteries and the personal property of individuals, so far as to cover the necessities of life.

In 1792 the amount raised by internal revenue was \$208,942; in 1866, \$309,226,813; in 1887, \$118,837,301.

**YOU CANNOT COUNT A TRILLION.**—It is impossible to count a trillion. Had Adam counted continuously from his creation to the present day, he would not have reached that number, for it would take him over 9,512 years. At the rate of 200 a minute, there could be counted 12,000 an hour, 288,000 a day, and 105,120,000 a year.

## HINTS TO ADVERTISERS.

The first thing for an advertiser to decide is the mediums which reach the desired class of customers. Cheap mediums do not, as a rule, bring good returns, neither does it follow that a periodical claiming a large circulation takes precedence over one with a less circulation. The tone of the publication and character of its readers determine much. A first class periodical with a *bona fide* paid circulation is far more desirable than a much larger sample copy circulation. People who think enough of a publication to buy it are very apt to read it.

Except in special cases, hand-bills and dodgers are of little or no account.

The advertisement must be attractive, and if lasting results be desired, the goods must be as represented, and the advertisement honestly worded.

The occasional advertiser reaps but meager results; 'tis the constant, persistent advertiser who reaps the most benefit.

The secret of success in advertising lies largely in keeping the name and goods constantly before the eye of the public.

Printer's ink is beneficial to any business, but common sense and good judgment are absolutely necessary. The shrewd advertiser and successful business man exercises as much care and discretion in placing his advertisement as he does in buying his goods.

## HOW TO COLLECT A DEBT.

Thousands of dollars are lost every day through negligence or carelessness of creditors.

If there is a fixed date for payment, be on hand promptly to receive it.

If not paid, follow it up closely.

If party cannot pay now, get a promise for another date of payment. Pleasant words and a genial bearing invariably are more effective than threats of legal measures.

If the debtor lives near, call and express your urgent needs of money, etc.

If you cannot get it all, take a part, and get a note for the balance. Notes are more easily handled and collected than open accounts.

If the debtor is irresponsible, get him to secure an indorser, so that you "can get the money on it at the bank," etc.

If possible, "know your man."

With some it is absolutely necessary to be sharp and positive, while the man who honestly intends to pay can be handled better by pleasant words, though frank and business-like.

If a debtor is at a distance, write a courteous letter, inclosing bill or statement, requesting prompt settlement.

If necessary, a second or third letter should be written.

## HOW TO MAKE CHANGE QUICKLY.

Always consider the amount of purchase as if that much money were already counted out, then add to amount of purchase enough small change to make even dollars, counting out the even dollars last until full amount is made up.

If the purchase amounts to 57 cents, and you are handed \$2.00 in payment, count out 43 cents first to make an even dollar. Then lay out the other dollar.

Should the purchase be \$3.69, to be taken out of \$20.00, begin with \$3.69 as the basis and make up even \$4.00 by laying out 31 cents. This 31 cents with the amount of the purchase you will consider as \$4.00, and count out even dollars to make up the \$20.00 which the customer has handed in.

## MERCHANTS' COST AND PRICE MARKS.

All merchants use private cipher marks to note cost or selling price of goods. The cipher is usually made up from some short word or sentence of nine or ten letters, as:

C O R N E L I U S, A.  
1 2 3 4 5 6 7 8 9 0.

Five dollars, according to this key, would be *caa*. But generally an extra letter is used to prevent repeating the mark for 0. If the sign for a second 0 in this case were *y*, we would have *ey* instead of *caa*.

## TIME IN WHICH MONEY DOUBLES.

Per Cent.	SIMPLE INT.	COMP. INT.	Per Cent.	SIMPLE INT.	COMP. INT.
2	50 years.	35 years.	5	20 years.	14 yrs. 75 da.
2½	40 years.	28 yrs. 26 da.	6	16 yrs. 8 mos.	11 yrs. 327 da.
3	33 yrs. 4 mos.	23 yrs. 164 da.	7	14 yrs. 104 da.	10 yrs. 89 da.
3½	28 yrs. 208 da.	20 yrs. 54 da.	8	12½ years.	9 yrs. 2 da.
4	25 years.	17 yrs. 246 da.	9	11 yrs. 40 da.	8 yrs. 16 da.
4½	22 yrs. 81 da.	15 yrs. 273 da.	10	10 years.	7 yrs. 100 da.

## "A Dollar Saved, a Dollar Earned."

The way to accumulate money is to save small sums with regularity. A small sum saved daily for fifty years will grow at the following rate:

DAILY SAVINGS.	RESULT.	DAILY SAVINGS.	RESULT.
One cent .....	\$ 950	Sixty cents .....	\$ 57,024
Ten cents .....	9,504	Seventy cents .....	66,528
Twenty cents .....	19,006	Eighty cents .....	76,032
Thirty cents .....	28,512	Ninety cents .....	85,537
Forty cents .....	38,015	One Dollar .....	475,208
Fifty cents .....	47,520		

## SHORT INTEREST RULES.

To find the interest on a given sum for any number of days, at any rate of interest, multiply the principal by the number of days and divide as follows:

At 3 per cent., by . . . .	120	At 9 per cent., by . . . .	40
At 4 per cent., by . . . .	90	At 10 per cent., by . . . .	36
At 5 per cent., by . . . .	72	At 12 per cent., by . . . .	30
At 6 per cent., by . . . .	60	At 15 per cent., by . . . .	24
At 7 per cent., by . . . .	52	At 20 per cent., by . . . .	18
At 8 per cent., by . . . .	45		

## TRADE DISCOUNTS.

Wholesale houses usually invoice their goods to retailers at 'list' prices. List prices were once upon a time supposed to be retail prices, but of late a system of "long" list prices has come into vogue in many lines of trade—that is, the list price is made exorbitantly high, so that wholesalers can give enormous discounts. These discounts, whether large or small, are called trade discounts, and are usually deducted at a certain rate per cent. from the face of invoice.

The amount of discount generally depends upon size of bill or terms of settlement, or both. Sometimes two or more discounts are allowed. Thus 30% and 5% is expressed 30 and 5, meaning first a discount of 30% and then 5% from the remainder.

30 and 5 is not 35%, but 33½%. 10, 5 and 3 off means three successive discounts.

A wholesale house allowing 10, 5 and 3 off gets more for its goods than it would at 18 off.

## HOW TO DETECT COUNTERFEIT MONEY.

In the space at disposal here, it is impossible of course to give a complete illustrated counterfeit detector, but the following simple rules, laid down by Bank Note Examiner Geo. R. Baker, will be found extremely valuable:

Examine the form and features of all human figures; if graceful, and features distinct, examine the drapery. Notice whether the folds lie naturally, and observe whether the fine strands of the hair are plain and distinct.

Examine the lettering. In a genuine bill it is absolutely perfect. There has never been a counterfeit put out but was more or less defective in the lettering.

Counterfeiters rarely, if ever, get the imprint or engraver's name perfect. The shading in the background of the vignette and over and around the letters forming the name of the bank, on a good bill, is even and perfect; on a counterfeit it is uneven and imperfect.

The die work around the figures of the denomination should be of the same character as the ornamental work surrounding it.

Never take a bill deficient in any of these points.

**BIG TREES.**—Of ninety-two redwood trees in Calaveras Grove, Cal., ten are over thirty feet in diameter, and eighty-two have a diameter of from fifteen to thirty feet. Their ages are estimated at from 1,000 to 3,500 years. Their height ranges from 150 to 237 feet.

# BANKERS' TIME TABLE.

**To Find the Number of Days Between Any Two Dates of the Same Year, or Two Consecutive Years,**

The numbers in black letter at head of the columns represent the months:—1, January; 2, February, etc. In leap years, add one to the corresponding numbers of all dates after February 28.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	365	397	425	456	486	517	547	578	609	639	700
2	2	367	398	426	457	487	518	548	579	610	640	701
3	3	368	399	427	458	488	519	549	580	611	641	702
4	4	369	400	428	459	489	520	550	581	612	642	703
5	5	370	401	429	460	490	521	551	582	613	643	704
6	6	371	402	430	461	491	522	552	583	614	644	705
7	7	372	403	431	462	492	523	553	584	615	645	706
8	8	373	404	432	463	493	524	554	585	616	646	707
9	9	374	405	433	464	494	525	555	586	617	647	708
10	10	375	406	434	465	495	526	556	587	618	648	709
11	11	376	407	435	466	496	527	557	588	619	649	710
12	12	377	408	436	467	497	528	558	589	620	650	711
13	13	378	409	437	468	498	529	559	591	621	651	712
14	14	379	410	438	469	499	530	560	591	622	652	713
15	15 <td>380</td> <td>411</td> <td>439</td> <td>470</td> <td>500</td> <td>531</td> <td>561</td> <td>592</td> <td>623</td> <td>653</td> <td>714</td>	380	411	439	470	500	531	561	592	623	653	714
16	16 <td>381</td> <td>412</td> <td>440</td> <td>471</td> <td>501</td> <td>532</td> <td>562</td> <td>593</td> <td>624</td> <td>654</td> <td>715</td>	381	412	440	471	501	532	562	593	624	654	715
17	17 <td>382</td> <td>413</td> <td>441</td> <td>472</td> <td>502</td> <td>533</td> <td>563</td> <td>594</td> <td>625</td> <td>655</td> <td>716</td>	382	413	441	472	502	533	563	594	625	655	716
18	18 <td>383</td> <td>414</td> <td>442</td> <td>473</td> <td>503</td> <td>534</td> <td>564</td> <td>595</td> <td>626</td> <td>656</td> <td>717</td>	383	414	442	473	503	534	564	595	626	656	717
19	19 <td>384</td> <td>415</td> <td>443</td> <td>474</td> <td>504</td> <td>535</td> <td>565</td> <td>596</td> <td>627</td> <td>657</td> <td>718</td>	384	415	443	474	504	535	565	596	627	657	718
20	20 <td>385</td> <td>416</td> <td>444</td> <td>475</td> <td>505</td> <td>536</td> <td>566</td> <td>597</td> <td>628</td> <td>658</td> <td>719</td>	385	416	444	475	505	536	566	597	628	658	719
21	21 <td>386</td> <td>417</td> <td>445</td> <td>476</td> <td>506</td> <td>537</td> <td>567</td> <td>598</td> <td>629</td> <td>659</td> <td>720</td>	386	417	445	476	506	537	567	598	629	659	720
22	22 <td>387</td> <td>418</td> <td>446</td> <td>477</td> <td>507</td> <td>538</td> <td>568</td> <td>599</td> <td>630</td> <td>660</td> <td>721</td>	387	418	446	477	507	538	568	599	630	660	721
23	23 <td>388</td> <td>419</td> <td>447</td> <td>478</td> <td>508</td> <td>539</td> <td>569</td> <td>600</td> <td>631</td> <td>661</td> <td>722</td>	388	419	447	478	508	539	569	600	631	661	722
24	24 <td>389</td> <td>420</td> <td>448</td> <td>479</td> <td>509</td> <td>540</td> <td>570</td> <td>601</td> <td>632</td> <td>662</td> <td>723</td>	389	420	448	479	509	540	570	601	632	662	723
25	25 <td>390</td> <td>421</td> <td>449</td> <td>480</td> <td>510</td> <td>541</td> <td>571</td> <td>602</td> <td>633</td> <td>663</td> <td>724</td>	390	421	449	480	510	541	571	602	633	663	724
26	26 <td>391</td> <td>422</td> <td>450</td> <td>481</td> <td>511</td> <td>542</td> <td>572</td> <td>603</td> <td>634</td> <td>664</td> <td>725</td>	391	422	450	481	511	542	572	603	634	664	725
27	27 <td>392</td> <td>423</td> <td>451</td> <td>482</td> <td>512</td> <td>543</td> <td>573</td> <td>604</td> <td>635</td> <td>665</td> <td>726</td>	392	423	451	482	512	543	573	604	635	665	726
28	28 <td>393</td> <td>424</td> <td>452</td> <td>483</td> <td>513</td> <td>544</td> <td>574</td> <td>605</td> <td>636</td> <td>666</td> <td>727</td>	393	424	452	483	513	544	574	605	636	666	727
29	29 <td>394</td> <td>...</td> <td>453</td> <td>484</td> <td>514</td> <td>515</td> <td>545</td> <td>575</td> <td>606</td> <td>637</td> <td>667</td>	394	...	453	484	514	515	545	575	606	637	667
30	30	395	...	454	485	515	546	576	607	638	668	699
31	31	396	...	455	486	516	...	577	608	639	...	730

# FACTS ABOUT RAILROADS AND TRANSPORTATION.

## Twenty Points on American Railroading.

1. There are in the United States 150,600 miles of railway—about half the mileage of the world. 2. The estimated cost is \$9,000,000,000. 3. The number of people employed by American railways is more than 1,000,000. 4. The fastest time made by a train is 422 6-10 miles in 7 hours, 23 minutes (443 minutes), one mile being made in 47 11-29 seconds, on the West Shore Railroad, New York. 5. The cost of a high-class eight-wheel



passenger locomotive is about \$8,500. 6. The longest mileage operated by a single system is that of the Atchison, Topeka & Santa Fe—about 8,000 miles. 7. The cost of a palace sleeping-car is about \$15,000, or \$17,000 if "vestibuled." 8. The longest railway bridge span in the United States is the Cantilever span in Poughkeepsie

bridge—548 feet. 9. The highest railroad bridge in the United States is the Kinzua viaduct on the Erie road—305 feet high. 10. The first locomotive in the United States was built by Peter Cooper. 11. The road carrying the largest number of passengers is the Manhattan Elevated Railroad, New York—525,000 a day, or 191,625,000 yearly. 12. The average daily earning of an American locomotive is about \$100. 13. The longest American railway tunnel is the Hoosac, on the Fitchburgh railway—4¾ miles. 14. The average cost of constructing a mile of railroad at the present time is about \$30,000. 15. The first sleeping-car was used upon the Cumberland Valley Railroad of Pennsylvania; from 1836 to 1848. 16. The chances of fatal accident in railway travel are very slight—one killed in ten million. Statistics show more are killed by falling out of windows than in railway accidents. 17. The line of railway extending farthest east and west is the Canadian Pacific, running from Quebec to the Pacific Ocean. 18. A steel rail, with average wear, lasts about eighteen years. 19. The road carrying the largest number of commuters is the Illinois Central at Chicago—4,828,128 commutation fares in 1887. 20. The fastest time made between Jersey City and San Francisco is 3 days, 7 hours, 39 minutes and 16 seconds. Special theatrical train, June, 1876.

## Train Management.

("Standard Code.")

A train while running must display two green flags by day and two green lights by night, one on each side of the rear of the train.

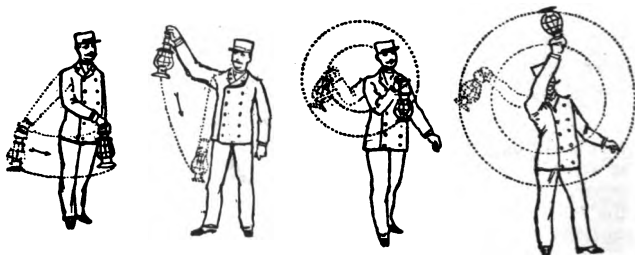
After sunset, or when obscured by fog or other cause, must display headlight in front and two red lights in rear.

## RAILROADS AND TRANSPORTATION.

Two green flags by day and two green lights by night, displayed in the places provided for that purpose on the front of an engine, denote that the train is followed by another train running on the same schedule and entitled to the same time-table rights as the train carrying the signals.

Two white flags by day and two white lights by night, carried in the same manner, denote that the train is an extra.

A blue flag by day and a blue light by night, placed on the end of a car, denotes that car inspectors are at work under or about the car or train and that it must not be coupled to or moved until the blue signal is removed.



### Swinging Lamp Signals.

1. A lamp swung across the track is the signal to stop. 2. A lamp raised and lowered vertically is the signal to move ahead. 3. A lamp swung vertically in a circle across the track, when the train is standing, is the signal to move back. 4. A lamp swung vertically in a circle at arm's length across the track, when the train is running, is the signal that the train has passed.

\*\* A flag, or the hand, moved in any of the directions given above, will indicate the same signal as given by a lamp.

### Colored Flag or Lantern Signals—Torpedoes.

("Standard Code.")

Red signifies danger.

Green signifies caution, go slowly.

White signifies safety.

Green and white signifies stop at flag stations for passengers or freight.

One cap or torpedo on rail means stop immediately.

Two caps or torpedoes on rail means reduce speed immediately and look out for danger signal.

## Locomotive Whistle Signals.

Just one long blast on the whistle, ———— this style,  
Is a sign of nearing town,  
A railroad crossing or junction, may be,  
And this —, the brakes whistled down.

Two long ———— are just the reverse of the last.  
And this — — the engine's reply  
When word comes from the conductor to stop, —  
A sort of cheerful "Aye! aye!"

These three ———— will show when the train comes apart.  
This — — — means two different things:  
That the train will back, or asks you to note  
Some special signal it brings.

These four ———— belong to the flagman alone,  
And these — — — — are meant for the crew;  
But this one ———— —, when crossing a road at grade,  
More nearly interests you.

Five short ones — — — — say to the flagman on guard,  
"Look out for a rear attack!"  
And a lot like this — — — — — that a heedless cow  
Or a deaf man is on the track!

D. B. BARNARD.

## Speed on Railroads.

Speed is hard to average. An average of 48 3-10 miles per hour is the fastest regular time in the United States. This is made on the Pennsylvania "limited" in its run from Jersey City to Philadelphia, 90 miles, in 112 minutes. The Flying Dutchman train is supposed to make the fastest time in the world, between London and Bristol, 118¼ miles, in less than two hours. The average, however, of even this fast train is only 59½ miles per hour. There are several other trains noted for remarkably fast time on short distances. Sometimes a straight and even grade for a distance of 20 miles will permit a train to run at the rate of more than a mile a minute. One train on the Canadian Pacific road from Cotaneau to Ottawa, averages 50 miles an hour for a distance of 78 miles. An average of 38½ miles an hour is considered fast traveling.

The largest and fastest passenger engine ever built is said to have been turned out of the Rhode Island Locomotive Works, at Providence, for the New York, Providence & Boston Railroad Company. She was designed to make the run from Providence to Groton, Conn., a distance of 62½ miles, including a dead stop at Mystic draw-bridge, as required by the statutes of Connecticut, in just 62½ minutes, pulling at the same time eight cars, four of them Pullmans.

## Steamboating.

The first idea of steam navigation was contained in a patent obtained in England by Hulls in 1736.

Fitch experimented in steam navigation on the Delaware river in 1783-4.

Oliver Evans was the next experimenter in steam navigation in 1785-6.

Ramsey was also an experimenter in Virginia in steam navigation in 1787.

W. Symington made a trial on the Forth and Clyde with a small but rudely constructed model of a steamer in 1789.

Chancellor Livingston built a steamer on the Hudson in 1797.

The first experiment in steamboating on the Thames, England, was in 1801.

Mr. Symington repeated his experiments on the Thames with success in 1802.

Fulton built the steamer, the North River, and in 1807 made a passage up the Hudson river to Albany from New York in thirty-three hours—the first steam navigation on record.

The next steamboat was the Car of Neptune, in 1808.

Fulton built the Orleans at Pittsburgh—the first steamer on





## FACTS ABOUT THE THERMOMETER.

western rivers. It was completed, and made the voyage to New Orleans, 2,000 miles, in 1811.

The first steam vessels of Europe commenced plying on the Clyde in 1812.

The Savannah, the first steamer to cross the ocean, was of 350 tons burden, and sailed for Liverpool from Savannah, Ga., July 15, 1819.

Capt. Johnson was paid £10,000, or \$50,000, for making the first steam voyage to India. The voyage was made on the steamer Enterprise, which sailed from Falmouth, England, Aug. 16, 1825.

The first war steamer was built in England in 1838.

### Capacity of a Ten-Ton Freight Car.

Whisky .....	60 barrels.	Lumber, green..	6,000 feet.
Salt .....	70 "	Lumber, dry....	10,000 feet.
Lime .....	70 "	Barley .....	300 bush.
Flour .....	90 "	Wheat .....	340 "
Eggs .....	130 to 160 "	Apples.....	370 "
Flour .....	200 sacks.	Corn .....	400 "
Cattle.....	18 to 20 head.	Potatoes .....	430 "
Hogs .....	50 to 60 "	Oats .....	680 "
Sheep .....	80 to 100 "	Bran .....	1,000 "

### Facts About the Thermometer.

	Reaumur.	Centigrade.	Fahrenheit.
Freezing Point .....	0	0	32
Vine Cultivation.....	8	10	50
Cotton Cultivation .....	16	20	68
Temperature of Brazil....	24	30	87
Hatching Eggs.....	32	40	104
	40	50	122
	48	60	140
	56	70	158
	64	80	176
	72	90	194
Water boils .....	80	100	212

Ice melts at 32°; temperature of globe, 50°; blood heat, 98°; alcohol boils, 174°; water boils, 212°; lead melts, 594°; heat of common fire, 1,140°; brass melts, 2,233°; iron melts, 3,479°.

### Comparison of Thermometric Scales.

To convert the degrees of Centigrade into those of Fahrenheit, multiply by 9, divide by 5, and add 32.

To convert degrees of Centigrade into those of Reaumur, multiply by 4, and divide by 5.

To convert degrees of Fahrenheit into those of Centigrade, deduct 32, multiply by 5, and divide by 9.

To convert degrees of Fahrenheit into those of Reaumur, deduct 32, divide by 9, and multiply by 4.

To convert degrees of Reaumur into those of Centigrade, multiply by 5, and divide by 4.

To convert degrees of Reaumur into those of Fahrenheit, multiply by 9, divide by 4, and add 32.

In De Lisle's thermometer, used in Russia, the gradation begins at boiling point, which is marked zero, and the freezing point is 150.

# FREEZING, FUSING AND BOILING POINTS.

SUBSTANCES.	REAUMUR.	CENTI- GRADE.	FAHREN- HEIT.
<b>FREEZING—</b>			
Bromine freezes at.....	—16°	—20°	— 4°
Oil Anise.....	8	10	50
“ Olive.....	8	10	50
“ Rose.....	12	15	60
Quicksilver.....	—31.5	—39.4	—39
Water.....	— 1	0	32
<b>FUSING—</b>			
Bismuth metal fuses at.....	200	264	507
Cadmium.....	248 8	315	592
Copper.....	874.6	1093	2000
Gold.....	961	1200	2200
Iodine.....	92	115	239
Iron.....	1230	1538	2800
Lead.....	255 5	325	617
Potassium.....	46	58	136
Phosphorus.....	34	44	111
Silver.....	816.8	1021	1870
“ Nitrate.....	159	198	389
Sodium.....	72	90	194
Steel.....	1452	1856	3300
Sulphur.....	72	90	194
Tin.....	173	230	446
Zinc.....	328	410	770
<b>BOILING—</b>			
Alcohol boils at.....	63	78	173
Bromine.....	50	53	145
Ether.....	28	35	95
“ Nitrous.....	11	14	57
Iodine.....	140	175	347
Olive Oil.....	252	315	600
Quicksilver.....	280	350	662
Water.....	80	100	212

**DANGERS OF FOUL AIR.**—If the condensed breath collected on the cool window panes of a room where a number of persons have been assembled be burned, a smell as of singed hair will show the presence of organic matter, and if the condensed breath be allowed to remain on the windows for a few days, it will be found, on examination by the microscope, that it is alive with animaculæ. It is the inhalation of air containing such putrescent matter which causes half of the sick-headaches, which might be avoided by a circulation of fresh air.

## FREEZING MIXTURES WITHOUT ICE.

Use water not warmer than 50° Fahrenheit.

MIXTURES.			DOWN TO	CHANGE
Nitrate Ammonia,	} each one part.....	50°	4°	46°
Water,				
Muriate Ammonia,	} each five parts.....	50	10.	40
Nitrate of Potash,				
Water, sixteen parts.....				
Muriate Ammonia,	} each five parts. ...	50	4	46
Nitrate of Potash,				
Sulphate of Soda, eight parts.....				
Water, sixteen parts.....				
Sulphate of Soda, three parts.....		50	— 3	53
Dilute Nitric Acid, two parts.....				
Nitrate of Ammonia,	} each one part ...	50	— 7	57
Carbonate Soda,				
Water,				
Phosphate Soda, nine parts.....		50	—12	62
Dilute Nitric Acid, four parts.....				
Sulphate of soda, five parts.....		50	3	47
Dilute Sulphuric Acid, four parts.....				
Sulphate of Soda, six parts.....				
Muriate Ammonia, four parts.....		50	—10	60
Nitrate of Potash, two parts.....				
Dilute Nitric Acid, four parts.....				
Sulphate of Soda, six parts.....				
Nitrate of Ammonia, five parts.....		50	—14	64
Dilute Nitric Acid, four parts.....				

## THE HEBREW RACE.

The Hebrew race is distributed over the Eastern continent as follows :

In Europe there are 5,400,000; in France, 63,000; Germany, 562,000, of which Alsace-Lorraine contains 39,000; Austro-Hungary, 1,544,000; Italy, 40,000; Netherlands, 82,000; Roumania, 265,000; Russia, 2,552,000; Turkey, 105,000, and in other countries 35,000, Belgium containing the smallest number, only 3,000.

In Asia there are 319,000; Asiatic Turkey, 47,000, in Palestine there being 25,000; Asiatic Russia, 47,000; Persia, 18,000; Middle Asia, 14,000; India, 19,000, and China, 1,000.

Africa contains 350,000; Egypt, 8,000; Tunis, 55,000; Algiers, 35,000; Morocco, 60,000; Tripoli, 6,000, and Abyssinia, 200,000.

The entire number of Hebrews in the world is nearly 6,300,000.

## PHYSICAL EXERCISE.

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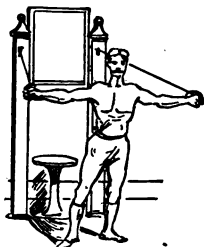
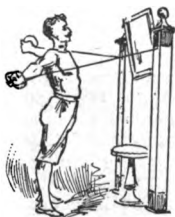
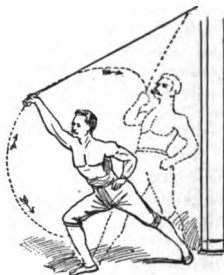
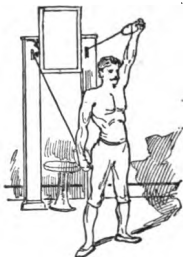
THE principal methods of developing the physique now prescribed by trainers are exercise with dumbbells, the bar bell and the chest weight. The rings and horizontal and parallel bars are also used, but not nearly to the extent that they formerly were. The movement has been all in the direction of the simplification of apparatus; in fact, one well-known teacher of the Boston Gymnasium when asked his opinion said: "Four bare walls and a floor, with a well-posted instructor, is all that is really required for a gymnasium."

Probably the most important as well as the simplest appliance for gymnasium work is the wooden dumbbell, which has displaced the ponderous iron bell of former days. Its weight is from three-quarters of a pound to a pound and a half, and with one in each hand a variety of motions can be gone through, which are of immense benefit in building up or toning down every muscle and all vital parts of the body.

The first object of an instructor in taking a beginner in hand is to increase the circulation. This is done by exercising the extremities, the first movement being one of the hands, after which come the wrists, then the arms, and next the head and feet. As the circulation is increased the necessity for a larger supply of oxygen, technically called "oxygen-hunger," is created, which is only satisfied by breathing exercises, which develop the lungs. After the circulation is in a satisfactory condition, the dumbbell instructor turns his attention to exercising the great muscles of the body, beginning with those of the back, strengthening which holds the body erect, thus increasing the chest capacity, invigorating the digestive organs, and, in fact, all the vital functions. By the use of very light weights an equal and symmetrical development of all parts of the body is obtained, and then there are no sudden demands on the heart and lungs.

After the dumbbell comes exercise with the round or bar bell. This is like the dumbbell, with the exception that the bar connecting the balls is four or five feet, instead of a few inches in length. Bar bells weigh from one to two pounds each, and are found most useful in building up the respiratory and digestive systems, their especial province being the strengthening of the erector muscles and increasing the flexibility of the chest.

Of all fixed apparatus in use the pulley weight stands easily first in importance. These weights are available for a greater variety of objects than any other gymnastic appliance, and can be used either for general exercise or for strengthening such muscles as most require it. With them a greater localization is possible than with the dumbbell, and for this reason they are recommended as a kind of supplement to the latter. As chest de-



1. The bar bell—chest expander. 2. Anterior muscular developer. 3. Developing loins and lumbar region—aid to digestion. 4. Side and loin development. 5. Giant pulley exercise—for elevating right side of chest. 6. Developing muscles that hold the shoulders back. 7. Developing muscles of front upper chest. 8. Posterior development—to make one erect. [310]

## PHYSICAL EXERCISE.

velopers and correctors of round shoulders they are most effective. As the name implies, they are simply weights attached to ropes, which pass over pulleys, and are provided with handles. The common pulley is placed at about the height of the shoulder of an average man, but recently those which can be adjusted to any desired height have been very generally introduced.

When more special localization is desired than can be obtained by means of the ordinary apparatus, what is known as the double-action chest weight is used. This differs from the ordinary kind in being provided with several pulleys, so that the strain may come at different angles. Double-action weights may be divided into three classes—high, low and side pulleys—each with its particular use.

The highest of all, known as the giant pulleys, are made especially for developing the muscles of the back and chest, and by stretching or elongating movements to increase the interior capacity of the chest. If the front of the chest is full and the back or side chest deficient, the pupil is set to work on the giant pulley. To build up the side-walls he stands with the back to the pulley-box and the left heel resting against it; the handle is grasped in the right hand if the right side of the chest is lacking in development, and then drawn straight down by the side; a step forward with the right foot, as long as possible, is taken, the line brought as far to the front and near the floor as can be done, and then the arm, held stiff, allowed to be drawn slowly up by the weight. To exercise the left side the same process is gone through with, the handle grasped in the left hand. Another kind of giant pulley is that which allows the operator to stand directly under it, and is used for increasing the lateral diameter of the chest. The handles are drawn straight down by the sides, the arms are then spread and drawn back by the weights. Generally speaking, high pulleys are most used for correcting high, round shoulders; low pulleys for low, round shoulders; side pulleys for individual high or low shoulders, and giant pulleys for the development of the walls of the chest and to correct spinal curvature.

The traveling rings, a line of iron rings covered with rubber and attached to long ropes fastened to the ceiling some ten feet apart, are also valuable in developing the muscles of the back, arms and sides. The first ring is grasped in one hand and a spring taken from an elevated platform. The momentum carries the gymnast to the next ring, which is seized with the free hand, and so the entire length of the line is traversed. The parallel bars, low and high, the flying rings, the horizontal bar and the trapeze all have their uses, but of late years they have been relegated to a position of distinct inferiority to that now occupied by the dumbbells and pulley weights.

# MEDICINE AND HYGIENE.

## Diseases and their Remedies.—Prescriptions by Eminent Practitioners.

**I**T should be clearly understood, that in all cases of disease, the advice of a skillful physician is of the first importance.

It is not, therefore, intended by the following information to supersede the important and necessary practice of the medical man; but rather, by exhibiting the treatment required, to show in what degree his aid is imperative. In cases, however, where the disorder may be simple or transient, or in which remote residence, or other circumstances, may deny the privilege of medical attendance, the following particulars will be found of the utmost value. Moreover, the hints given upon what should be AVOIDED will be of great service to the patient, since the *physiological* is no less important than the *medical* treatment of disease. The numbers refer to prescriptions on pp. 315-318.

**APOPLEXY**—Lay the head upon a bag of pounded ice, immediately and large bleeding from the arm, cupping neck, leeches to the temples, aperients Nos. 1 and 7, one or two drops of cotton oil rubbed or dropped on the tongue. Avoid excesses, intemperance, animal food.

**BILE, BILIOUS, OR LIVER COMPLAINTS**—Abstinence from malt liquor, cool homœopathic cocoa for drink, no tea or coffee, few vegetables, no broths or soups; lean juicy meat not overcooked for dinner, with stale bread occasionally and a slice of toasted bacon for breakfast. Nos. 44 and 45.

**CHICKEN POX**—Mild aperients, No. 4, succeeded by No. 7, and No. 8, if much fever accompany the eruption.

**CHILBLAINS**—Warm, dry woolen clothing to exposed parts in cold weather, as a preventive. In the first stage, friction with No. 48, used cold. When ulcers form they should be washed twice daily with carbolic soap and dressed with Lenzated zinc ointment. Or, chilblains in every stage, whether of simple inflammation or open ulcer, may always be successfully treated by Goulard's extract, used pure or applied on lint twice a day.

**COMMON CONTINUED FEVER**—Aperients; in the commencement No. 1, followed by No. 7; then diaphoretics, No. 8, and afterwards tonics, No. 13, in the stage of weakness. Avoid all excesses.

**COMMON COUGH**—The linctus, No. 42 or No. 43, abstinence from malt liquor, and protection from cold, damp air. Avoid cold, damp, and draughts.

**CONSTIPATION**—The observance of a regular period of evacuating the bowels, which is most proper in the morning after breakfast. The use of mild aperients, No. 37, and brown bread instead of white. There should be an entire change in the dietary for a few days while taking opening medicine.

**CONSUMPTION**—The disease may be complicated with various morbid conditions of the lungs and heart, which require appropriate treatment. Take cod liver oil, malt and whisky. To allay the cough, No. 32 is an admirable remedy. Avoid cold, damp, excitement and over-exertion.

**CONVULSIONS (CHILDREN)**—If during teething, free lancing of the gums, the warm bath, cold applications to the head, leeches to the temples, an emetic, and a laxative clyster, No. 20.

**CROUP**—Leeches to the throat, with hot fomentations as long as the attack lasts; the emetic, No. 16, afterwards the aperient, No. 5. Avoid cold and damp. Keep the air in the sick-room moistened with steam.

**A SIMPLE CROUP REMEDY**.—Take the white of an egg, stir it

## MEDICINE AND HYGIENE.

thoroughly into a small quantity of sweetened water, and give it in repeated doses until a cure is effected. If one egg is not sufficient, a second, or even a third should be used.

**DROPSY**—Evacuate the water by means of No. 10, and by rubbing camphorated oil into the body night and morning.

**EPILEPSY**—If accompanied or produced by fullness of the vessels of the head, leeches to the temples, blisters, and No. 1 and No. 7. If from debility or confirmed epilepsy, the mixture No. 18. Avoid drinking and excitement. Let the patient alone during the convulsion.

**ERUPTIONS ON THE FACE**—The powder, No. 30, internally, sponging the face with the lotion No. 31. Avoid excesses in diet.

**ERYSIPELAS**—Aperients, if the patient be strong, No. 1, followed by No. 7, then tonics, No. 27. No. 27 may be used from the commencement for weak subjects.

**FAINTNESS**—Effusion of cold water on the face, stimulants to the nostrils, pure air, and the recumbent position; afterwards, avoidance of the exciting cause. Avoid excitement.

**FROST-BITE AND FROZEN LIMBS**—No heating or stimulating liquors must be given. Rub the parts affected with ice, cold, or snow water, and lay the patient on a cold bed.

**GOUT**—The aperients No. 1, followed by No. 24, bathing the parts with gin-and-water; for drink, weak tea or coffee. Warmth by flannels. Abstain from wines, spirits, and animal food.

**GRAVEL**—No. 5, followed by No. 7, the free use of magnesia as an aperient. The pill No. 22. Abstain from fermented drinks and hard water. Another form of gravel must be treated by mineral acids, given three times a day.

**WHOOPIING COUGH**—Whooping cough may be complicated with congestion or inflammation of the lungs, or convulsions, and then becomes a serious disease. If uncomplicated, No. 43.

**HYSTERICIS**—The fit may be prevented by the administration of thirty drops of laudanum, and as many of ether. When it has taken place, open the windows, loosen the tight parts of the dress, sprinkle cold water on the face, etc. A glass of wine or cold water when the patient can swallow. Avoid excitement and tight lacing.

**INDIGESTION**—The pills No. 2, with the mixture No. 18, at the same time abstinence from veal, pork, mackerel, salmon, pastry, and beer; for drink, homœopathic cocoa, a glass of cold spring water the first thing every morning. Avoid excesses.

**INFLAMMATION OF THE BLADDER**—Aperients No. 5 and No. 7, the warm bath, afterwards opium; the pill No. 11, three times a day till relieved. Avoid fermented liquors, etc. Large quantities of water should be taken, especially spring water containing lithia.

**INFLAMMATION OF THE BOWELS**—Leeches, blisters, fomentations, hot baths, iced drinks, the pills No. 19; move the bowels with clysters, if necessary, No. 20. Avoid cold, indigestible food, etc.

**INFLAMMATION OF THE BRAIN**—Application of cold to the head, bleeding from the temples or back of the neck by leeches or cupping; aperients No. 1, followed by No. 7, No. 15. Avoid excitement, study, intemperance.

**INFLAMMATION OF THE KIDNEYS**—Leeches over the seat of pain, aperients No. 5, followed by No. 49; the warm bath. Avoid violent exercise, rich living.

**INFLAMMATION OF THE LIVER**—Leeches over the right side, the seat of pain, blisters, aperients No. 1, followed by No. 7, afterwards the pills No. 19, till the gums are slightly tender. Avoid cold, damp, intemperance, and anxiety.

**INFLAMMATION OF THE LUNGS**—Leeches to seat of pain,



## MEDICINE AND HYGIENE.

succeeded by a blister; the demulcent mixture, No. 14, to allay the cough, with the powders No. 15, whisky and milk. Avoid cold, damp, and draughts.

**INFLAMMATION OF THE STOMACH**—Leeches to the pit of the stomach, followed by fomentations, cold iced water for drink, bowels to be evacuated by clysters; abstinence from all food except cold gruel, milk and water. Avoid excesses and condiments.

**INFLAMMATORY SORE THROAT**—Leeches and blisters externally, aperients No. 1, followed by number 7; gargle to clear the throat, No. 17. Avoid cold, damp, and draughts.

**INFLAMED EYES**—The bowels to be regulated by No. 5, drop 5% cocaine solution in the eye every three or four hours, the eye to be bathed with No. 35.

**INFLUENZA**—No. 4 as an aperient and diaphoretic. No. 14 to allay fever and cough. No. 28 as a tonic, when weakness only remains. Avoid cold and damp, use clothing suited to the changes of temperature.

**INTERMITTENT FEVER, OR AGUE**—Take No. 13 during the intermission of the paroxysm of the fever; keeping the bowels free with a wine glass of No. 7. Avoid bad air, stagnant pools, etc.

**ITCH**—The ointment No. 28, or lotion No. 29.

**JAUNDICE**—The pills No. 1, afterwards the mixture No. 7, drinking freely of dandelion tea.

**LOOSENESS OF THE BOWELS (ENGLISH CHOLERA)**—One pill No. 10, repeated if necessary; afterwards the mixture No. 21. Avoid unripe fruits, acid drinks, ginger beer; wrap flannel around the abdomen.

**MEASLES**—A well-ventilated room, aperients No. 4, with No. 14 to allay the cough and fever.

**MENSTRUATION (EXCESSIVE)**—No. 40 during the attack, with rest in the recumbent position; in the intervals, No. 39.

**MENSTRUATION (SCANTY)**—In strong patients, cupping the loins, exercise in the open air, No. 40, the feet in warm water before the expected period, the pills No. 38; in weak subjects No. 39. Gentle and regular exercise. Avoid hot rooms, and too much sleep. In cases of this description it is desirable to apply to a medical man for advice. It may be useful to many to point out that pennyroyal tea is a simple and useful medicine for inducing the desired result.

**MENSTRUATION (PAINFUL)**—No. 41 during the attack; in the intervals, No. 38 twice a week, with No. 39. Avoid cold, mental excitement, etc.

**MUMPS**—Fomentation with a decoction of camomiles and poppy heads; No. 4 as an aperient, and No. 9 during the stage of fever. Avoid cold, and attend to the regularity of the bowels.

**NERVOUSNESS**—Cheerful society, early rising, exercise in the open air, particularly on horseback, and No. 12. Avoid excitement, study, and late meals.

**PALPITATION OF THE HEART**—The pills No. 2, with the mixture No. 12.

**PILES**—The paste No. 34, at the same time a regulated diet. When the piles are external, or can be reached, one or two applications of Goulard's extract, with an occasional dose of lenitive electuary, will generally succeed in curing them.

**QUINSY**—A blister applied all around the throat; an emetic, No. 16, commonly succeeds in breaking the abscess; afterwards the gargle No. 17. Avoid cold and damp.

**RHEUMATISM**—Bathe the affected parts with No. 23, and take internally No. 24, with No. 25 at bedtime, to ease pain, etc. Avoid damp and cold, wear flannel.

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**RICKETS**—The powder No. 33, a dry, pure atmosphere, a nourishing diet.

**RINGWORM**—The lotion No. 32, with the occasional use of the powder No. 5. Fresh air and cleanliness.

**SCARLET FEVER**—Well-ventilated room, sponging the body when hot with cold or tepid vinegar, or spirit and water; aperients, No. 4; diaphoretics, No. 8. If dropsy succeed the disappearance of the eruption, frequent purging with No. 5, succeeded by No. 7.

**SCROFULA**—Pure air, light but warm clothing, diet of fresh animal food; bowels to be regulated by No. 6 and No. 26, taken regularly for a considerable time.

**SCURVY**—Fresh animal and vegetable food, and the free use of ripe fruits and lemon juice. Avoid cold and damp.

**SMALLPOX**—A well-ventilated apartment, mild aperients; if fever be present, No. 7, succeeded by diaphoretics No. 8, and tonics No. 13 in the stage of debility, or decline of the eruption.

**ST. VITUS DANCE**—The occasional use, in the commencement, of No. 5, followed by No. 7, afterwards No. 46.

**THRUSH**—One of the powders No. 6 every other night; in the intervals a dessertspoonful of the mixture No. 18 three times a day; white spots to be dressed with the honey of borax.

**TIC DOLOREUX**—Regulate the bowels with No. 3, and take, in the intervals of pain, No. 27. Avoid cold, damp, and mental anxiety.

**TOOTHACHE**—Continue the use of No. 3 for a few alternate days. Apply liquor ammoniæ to reduce the pain, and when that is accomplished, fill the decayed spots with silver succedaneum without delay, or the pain will return. A drop of creosote, or a few drops of chloroform on cotton, applied to the tooth, or a few grains of camphor placed in the decayed opening, or camphor moistened with turpentine, will often afford instant relief.

**TYPHUS FEVER**—Sponging the body with cold or tepid water, a well-ventilated apartment, cold applications to the head and temples. Aperients No. 4, with refrigerants No. 9, tonics No. 13 in the stage of debility.

**WATER ON THE BRAIN**—Local bleeding by means of leeches, blisters, aperients No. 5, and mercurial medicines, No. 15.

**WHITES**—The mixture No. 36, with the injection No. 37. Clothing light but warm, moderate exercise in the open air, country residence.

**WORMS IN THE INTESTINES**—The aperient No. 5, followed by No. 7, afterwards the free use of lime water and milk in equal parts, a pint daily. Avoid unwholesome food.

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## PRESCRIPTIONS.

*To be used in the cases enumerated under the head "Diseases"  
(pages 312-315.)*

The following prescriptions, originally derived from various prescribers' Pharmacopœias, and now carefully revised, embody the favorite remedies employed by the most eminent physicians:

1. Take of powdered aloes, nine grains; extract of colocynth, compound, eighteen grains; calomel, nine grains; tartrate of antimony, two grains; mucilage, sufficient to make a mass, which is divided into six pills; two to be taken every twenty-four hours, till they act thoroughly on the bowels; in cases of inflammation, apoplexy, etc.

2. Powdered rhubarb, Socotrine aloes, and gum mastic, each one scruple; make into twelve pills; one before and one after dinner.

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3. Compound extract of colocynth, extract of jalap, and Castile soap, of each one scruple; make into twelve pills.

4. James' powder, five grains; calomel, three grains; in fevers, for adults. For children, the following: Powdered camphor, one scruple; calomel and powdered scammony, of each nine grains; James' powder, six grains; mix, and divide into six powders. Half of one powder twice a day for an infant a year old; a whole powder for two years; and for four years, the same three times a day.

5. James' powder, six grains; powdered jalap, ten grains; mix, and divide into three or four powders, according to the child's age; in one powder if for an adult.

6. Powdered rhubarb, four grains; mercury and chalk, three grains; ginger in powder, one grain: an alterative aperient for children.

7. Fluid extract cascara, six drams; tincture aloes four drams; tincture hyoscyamus, four drams; neutralizing cordial, two ounces; dessertspoonful every four hours until the bowels move freely.

8. Nitrate of potass, one dram and a half; spirits of nitric ether, half an ounce; camphor mixture, and the spirit of mindererus, each four ounces; in fevers, etc.; two tablespoonfuls, three times a day, and for children a dessertspoonful every four hours.

9. Spirit of nitric ether, three drams; dilute nitric acid, two drams; syrup, three drams; camphor mixture, seven ounces; in fevers, etc., with debility; dose as in preceding prescription.

10. Decoction of broom, half a pint; cream of tartar, one ounce; tincture of squills, two drams; in dropsies; a third part three times a day.

11. Pills of soap and opium, five grains for a dose, as directed.

12. Ammoniated tincture of valerian, six drams; camphor mixture, seven ounces; a fourth part three times a day; in spasmodic and hysterical disorders.

13. Bisulphate of quinia, half a dram; dilute sulphuric acid, twenty drops; compound infusion of roses, eight ounces; two tablespoonfuls every four hours, in intermittent and other fevers, during the absence of the paroxysm.

14. Almond mixture, seven ounces and a half; wine of antimony and ipecacuanha, of each one dram and a half; a tablespoonful every four hours; in cough with fever, etc.

15. Calomel, one grain; powdered white sugar, two grains; to make a powder to be placed on the tongue every two or three hours. Should the calomel act on the bowels, powdered kino is to be substituted for the sugar.

16. Antimony and ipecacuanha wines, of each an ounce; a teaspoonful every ten minutes for a child till vomiting is produced; but for an adult a large tablespoonful should be taken.

17. Compound infusion of roses, seven ounces; tincture of myrrh, one ounce.

18. Infusion of orange peel, seven ounces; tincture of hops, half an ounce; and a dram of carbonate of soda; two tablespoonfuls twice a day. Or infusion of valerian, seven ounces; carbonate of ammonia, two scruples; compound tincture of bark, six drams; spirits of ether, two drams; one tablespoonful every twenty-four hours.

19. Blue pill, four grains; opium, half a grain; to be taken three times a day.

20. For a Clyster—A pint and a half of gruel or fat broth, a tablespoonful of castor oil, one of common salt, and a lump of butter; mix, to be injected slowly. A third of this quantity is enough for an infant.

21. Chalk mixture, seven ounces; aromatic and opiate confection, of each one dram; tincture of catechu, six drams; two tablespoonfuls every two hours.

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22. Carbonate of soda, powdered rhubarb, and Castile soap, each one dram; make thirty-six pills; three twice a day.

23. Lotion—Common salt, one ounce; distilled water, seven ounces; spirits of wine, one ounce; mix.

24. Dried sulphate of magnesia, six drams; heavy carbonate of magnesia, two drams; wine of colchicum, two drams; water, eight ounces; take two tablespoonfuls every four hours.

25. Compound powder of ipecacuanha, ten grains; powdered guaiacum, four grains; in a powder at bedtime.

26. Brandish's solution of potash; thirty drops twice a day in a wineglass of beer.

27. Bisulphate of quinia, half a dram; dilute sulphuric acid, ten drops; compound infusion of roses, eight ounces; two tablespoonfuls every eight hours, and as a tonic in the stage of weakness succeeding fever.

28. Flowers of sulphur, two ounces; hog's lard, four ounces; white hellebore powder, half an ounce; oil of lavender, sixty drops.

29. Iodide of potass, two drams; distilled water, eight ounces.

30. Flowers of sulphur, half a dram; carbonate of soda, a scruple; tartarized antimony, one-eighth of a grain; one powder night and morning, in eruptions of the skin or face.

31. Milk of bitter almonds, seven ounces; bichloride of mercury, four grains; spirits of rosemary, one ounce; bathe the eruption with this lotion three times a day.

32. Sulphate of zinc, two scruples; sugar of lead, fifteen grains; distilled water, six ounces; the parts to be washed with the lotion three times a day.

33. Carbonate of iron, six grains; powdered rhubarb, four grains; one powder night and morning.

34. Aromatic powder and pepsin, each one dram; make twelve powders; one three or four times a day.

35. Sulphate of zinc, twelve grains; wine of opium, one dram; rosewater, six ounces.

36. Sulphate of magnesia, six drams; sulphate of iron, ten grains; diluted sulphuric acid, forty drops; tincture of cardamoms (compound), half an ounce; water, seven ounces; a fourth part night and morning.

37. Decoction of oak bark, a pint; dried alum, half an ounce; for an injection; a syringe full to be used night and morning.

38. Compound gamboge pill and a pill of asafœtida and aloes; of each half a dram; make twelve pills; two twice or three times a week.

39. Griffith's mixture—one tablespoonful three times a day.

40. Ergot of rye, five grains; in a powder, to be taken every four hours. This should only be taken under medical advice and sanction.

41. Powdered opium, half a grain; camphor, two grains, in a pill; to be taken every three or four hours whilst in pain.

42. Syrup of balsam of tolu, two ounces; the muriate of morphia, two grains; muriatic acid, twenty drops; a teaspoonful twice a day.

43. Salts of tartar, two scruples; twenty grains of powdered cochineal;  $\frac{1}{4}$  lb of honey; water, half a pint; boil and give a tablespoonful three times a day.

44. Calomel, ten grains; Castile soap, extract of jalap, extract of colocynth, of each one scruple; oil of juniper, five drops; make into fifteen pills; one three times a day.

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**45.** Infusion of orange peel, eight ounces; carbonate of soda, one dram, and compound tincture of cardamoms, half an ounce; take a tablespoonful three times a day succeeding the pills.

**46.** Carbonate of iron, three ounces; syrup of ginger sufficient to make an electuary; a teaspoonful three times a day.

**47.** Take of Castile soap, compound extract of colocynth, compound rhubarb pill and the extract of jalap, each one scruple; oil of caraway, ten drops; make into twenty pills, and take one after dinner every day whilst necessary.

**48.** Spirit of rosemary, five parts; spirit of wine, or spirit of turpentine, one part.

**49.** Take of thick mucilage, one ounce; castor oil, twelve drams; make into an emulsion; add mint water, four ounces; spirit of nitre, three drams; laudanum, one dram; mixture of squills, one dram; and syrup, seven drams; mix; two tablespoonfuls every six hours.

### Rules for the Preservation of Health.

**PURE ATMOSPHERIC AIR** is composed of nitrogen, oxygen and a very small proportion of carbonic acid gas. Air once breathed has lost the chief part of its oxygen and acquired a proportionate increase of carbonic acid gas. Therefore, health requires that we breathe the same air once only.

**THE SOLID PART OF OUR BODIES** is continually wasting and requires to be repaired by fresh substances. Therefore, food which is to repair the loss should be taken with due regard to the exercise and waste of the body.

**THE FLUID PART OF OUR BODIES** also wastes constantly; there is but one fluid in animals, which is water. Therefore, water only is necessary, and no artifice can produce a better drink.

**THE FLUID OF OUR BODIES** is to the solid in proportion as nine to one. Therefore, a like proportion should prevail in the total amount of food taken.

**LIGHT EXERCISES** AN IMPORTANT INFLUENCE upon the growth and vigor of animals and plants. Therefore, our dwellings should freely admit the solar rays.

**DECOMPOSING ANIMAL AND VEGETABLE SUBSTANCES** yield various noxious gases which enter the lungs and corrupt the blood. Therefore, all impurities should be kept away from our abodes, and every precaution be observed to secure a pure atmosphere.

**WARMTH IS ESSENTIAL** to all the bodily functions. Therefore, an equal bodily temperature should be maintained by exercise, by clothing or by fire.

**EXERCISE WARMS, INVIGORATES** and purifies the body; clothing preserves the warmth the body generates; fire imparts warmth externally. Therefore, to obtain and preserve warmth, exercise and clothing are preferable to fire.

**MENTAL AND BODILY EXERCISE** are equally essential to the general health and happiness. Therefore, labor and study should succeed each other.

**MAN WILL LIVE MOST HEALTHILY** upon simple solids and fluids, of which a sufficient but temperate quantity should be taken. Therefore, over-indulgence in strong drinks, tobacco, snuff, opium, and all mere indulgences, should be avoided.

**SUDDEN ALTERNATIONS OF HEAT AND COLD** are dangerous (especially to the young and the aged). Therefore, clothing, in quality and quantity, should be adapted to the alternations of night and day and of the seasons; and drinking cold water when the body is hot, and hot tea and soups when cold, are productive of many evils.

## MEDICINE AND HYGIENE.

**THE SKIN IS A HIGHLY ORGANIZED MEMBRANE** full of minute pores, cells, blood vessels and nerves; it imbibes moisture or throws it off, according to the state of the atmosphere and the temperature of the body. It also "breathes," as do the lungs (though less actively). All the internal organs sympathize with the skin. Therefore, it should be repeatedly cleansed.

**FIRE CONSUMES THE OXYGEN** of the air and produces noxious gases. Therefore, the air is less pure in the presence of candles, gas or coal fire, than otherwise, and the deterioration should be repaired by increased ventilation.

**LATE HOURS AND ANXIOUS PURSUITS** exhaust the nervous system and produce disease and premature death. Therefore, the hours of labor and study should be short.

**MODERATION IN EATING** and drinking, short hours of labor and study, regularity in exercise, recreation and rest, cleanliness, equanimity of temper and equality of temperature—these are the great essentials to that which surpasses all wealth, health of mind and body.

### HOMŒOPATHY.

**PRINCIPLES OF HOMŒOPATHY.**—As homœopathy is now practiced so widely, and, indeed, preferred to the older system in many families, this department could scarcely lay claim to be considered complete without a brief mention of the principal remedies used and recommended by homœopathic practitioners, and the disorders for which these remedies are especially applicable. The principle of homœopathy is set forth in the Latin words "*similia similibus curantur*," the meaning of which is "likes are cured by likes." The homœopathist, in order to cure a disease, administers a medicine which would produce in a perfectly healthy subject symptoms *like* but not *identical* with, or the *same* as, the symptoms to counteract which the medicine is given. He, therefore, first makes himself thoroughly acquainted with the symptoms that are exhibited by the sufferer; having ascertained these, in order to neutralize them and restore the state of the patient's health to a state of equilibrium, so to speak, he administers preparations that would produce symptoms of a like character in persons in good health. It is not said, be it remembered, that the drug can produce in a healthy person the disease from which the patient is suffering; it is only advanced by homœopathists that the drug given has the power of producing in a person in health symptoms similar to those of the disease under which the patient is languishing, and that the correct mode of treatment is to counteract the disease symptoms by the artificial production of similar symptoms by medical means, or, in other words, to suit the medicine to the disorder, by the previously acquired knowledge of the effects of the drug by experiment on a healthy person.

**HOMŒOPATHIC REMEDIES** are given in the form of globules or tinctures, the latter being generally preferred by homœopathic practitioners. When contrasted with the doses of drugs given by allopathists, the small doses administered by homœopathists

## HOMŒOPATHIC REMEDIES.

must at first sight appear wholly inadequate to the purpose for which they are given; but homœopaths, whose dilution and trituration diffuse the drug given throughout the vehicle in which it is administered, argue that by this *extension of its surface* the active power of the drug is greatly increased. Large doses of certain drugs administered for certain purposes will pass through the system without in any way affecting those organs which will be acted on most powerfully by the very same drugs when administered in much smaller doses. Thus a small dose of sweet spirit of nitre will act on the skin and promote perspiration, but a large dose will act as a diuretic only and exert no influence on the skin.

Great stress is laid by homœopaths on attention to diet, but not so much so in the present day as when the system was first introduced. The reader will find a list of articles of food that may and may not be taken in a succeeding page. Below are given briefly a few of the more common ailments "that flesh is heir to," with the symptoms by which they are indicated and the medicines by which they may be alleviated and eventually cured.

**ASTHMA**, an ailment which should be referred in all cases to the medical practitioner. *Symptoms.* Difficulty in breathing, with cough, either spasmodic and without expectoration, or accompanied with much expectoration. *Medicines.* Aconitum napellus, especially with congestion or slight spitting of blood; Antimonium tartaricum for rattling and wheezing in the chest; Arsenicum for chronic asthma; Ipecacuanha; Nux vomica.

**BILIOUS ATTACKS**, if attended with diarrhœa and copious evacuations of a bright yellow color. *Medicines.* Bryonia, if arising from sedentary occupation, or from eating and drinking too freely; or Nux vomica and Mercurius in alternation, the former correcting constipation and the latter nausea, fullness at the pit of the stomach and a foul tongue.

**BRONCHITIS.** *Symptoms.* Catarrh, accompanied with fever; expectoration, dark, thick, and sometimes streaked with blood; urine dark, thick and scanty. *Medicines.* Aconitum napellus; especially in earlier stages; Bryonia for pain in coughing and difficulty in breathing; Antimonium tartaricum, loose cough, with much expectoration, and a feeling of, and tendency to, suffocation; ipecacuanha, accumulation of phlegm in bronchial tubes and for children.

**BRUISES AND WOUNDS.**—For all bruises, black eyes, etc., apply Arnica lotion; for slight wounds, after washing well with cold water, apply Arnica plaster; to stop bleeding when ordinary means fail, and for larger wounds apply concentrated tincture of Calendula.

**COLD IN THE HEAD OR CATARRH.** *Symptoms.* Feverish feeling generally, and especially about the head, eyes, and nose, running from, and obstruction of nose; soreness and irritation of the throat and bronchial tubes. *Medicines.* Aconitum napellus for feverish symptoms; Belladonna for sore throat and headache with inclination to cough; Mercurius for running from nose and sneezing; Nux vomica for stoppage of nostrils; Chamomilla for children and women, for whom Pulsatilla is also useful in such cases.

**CHILBLAINS.** *Symptoms.* Irritation and itching of the skin, which assumes a bluish red color. *Medicines.* Arnica montana, taken internally or used as outward application, unless the chilblain be broken, when Arsenicum should be used. If the swelling and irritation do not yield to these remedies, use Belladonna and Rhus toxicodendron.

## HOMŒOPATHIC REMEDIES.

**CHOLERA.** 1. Bilious cholera. *Symptoms.* Nausea, proceeding to vomiting, griping of the bowels, watery and offensive evacuations, in which much bile is present, accompanied with weakness and depression. *Medicines.* Bryonia, with ipecacuanha at commencement of attack. 2. Malignant or Asiatic cholera. *Symptoms* as in bilious cholera, but in a more aggravated form, followed by what is called the "cold stage," marked by great severity of griping pain in stomach accompanied with frequent and copious watery evacuations, and presently with cramps in all parts of the body; after which the extremities become chilled, the pulse scarcely discernible, the result of which is stupor and ultimately death. *Medicines.* Camphor in the form of tincture, in frequent doses, until the sufferer begins to feel warmth returning to the body, and perspiration ensues. In the latter stages, Cuprum and Veratrum.

**TINCTURE OF CAMPHOR** is one of the most useful of the homœopathic remedies in all cases of colic, diarrhœa, etc. In ordinary cases fifteen drops on sugar may be taken every quarter of an hour until the pain is allayed. In more aggravated cases, and in cases of cholera, a few drops may be taken at intervals of from two to five minutes. A dose of fifteen drops of camphor on sugar tends to counteract a chill if taken soon after premonitory symptoms show themselves, and act as a prophylactic against cold.

**COLIC OR STOMACH ACHE.**—This disorder is indicated by griping pains in the bowels, which sometimes extend upwards into and over the region of the chest. Sometimes the pain is attended with vomiting and cold perspiration. A warm bath is useful, and hot flannels, or a jar or bottle filled with hot water should be applied to the abdomen. *Medicines.* Aconitum napellus, especially when the abdomen is tender to the touch, and the patient is feverish; Belladonna for severe griping and spasmodic pains; Bryonia for bilious colic and diarrhœa; Chamomilla for children.

**CONSTIPATION.**—Women are more subject than men to this confined state of the bowels, which will, in many cases, yield to exercise, plain, nutritious diet, with vegetables and cooked fruit, and but little bread, and an enema of milk and water, or thin gruel if it is some time since there has been any action of the bowels. *Medicines.* Bryonia, especially for rheumatic patients, and disturbed state of the stomach; Nux vomica, for persons of sedentary habits, especially males; Pulsatilla, for women; Sulphur, for constipation that is habitual or of long continuance.

**CONVULSIONS.**—For convulsions arising from whatever cause a warm bath is desirable, and a milk and water enema, if the child's bowels are confined. *Medicines.* Belladonna and Chamomilla, if the convulsions are caused by teething, with Aconitum napellus if the little patient be feverish; Aconitum napellus, Cina, and Belladonna, for convulsions caused by worms; Aconite and Coffœa, when they arise from fright; Ipecacuanha and Nux vomica, when they have been caused by repletion, or food that is difficult of digestion.

**COUGH.**—For this disorder, a light farinaceous diet is desirable, with plenty of out-door exercise and constant use of the sponging-bath. *Medicines.* Aconitum napellus, for a hard, dry, hacking cough; Antimonium, for cough with wheezing and difficulty of expectoration; Belladonna, for spasmodic cough, with tickling in the throat, or sore throat; Bryonia, for hard, dry cough, with expectorations streaked with blood; ipecacuanha, for children.

**CROUP.**—As this disorder frequently and quickly terminates fatally, recourse should be had to a duly qualified practitioner as soon as possible. The disease lies chiefly in the larynx and bronchial tubes, and is easily recognizable by the sharp, barking sound of the cough. A warm bath and mustard poultice will often tend to give relief. *Medicines.* Aconitum napellus, in the earlier stages of the disorder, and Spongia and Hepar sulphuris, in the more advanced stages, the latter medicine being desirable when the cough is not so violent and the breathing easier.

**DIARRHŒA.**—The *medicines* to be used in this disorder are those which are mentioned under colic and bilious attacks.

**DYSENTERY** is somewhat similar to diarrhœa, but the symp-



## HOMŒOPATHIC REMEDIES.

toms are more aggravated in character, and the evacuations are chiefly mucus streaked with blood. As a local remedy hot flannels or a stone jar filled with hot water and wrapped in flannel should be applied to the abdomen. *Medicines.* Colocynthis and Mercurius in alternation.

**DYSPEPSIA OR INDIGESTION** arises from weakness of the digestive organs. *Symptoms.* Chief among these are habitual costiveness, heartburn and nausea, disinclination to eat, listlessness and weakness, accompanied with fatigue after walking etc., restlessness and disturbed sleep at night, bad taste in the mouth, with white tongue, especially in the morning, accompanied at times with fullness in the region of the stomach, and flatulence, which causes disturbance of the heart. The causes of indigestion are too numerous to be mentioned here, but they may be inferred when it is said that scrupulous attention must be paid to diet (see p. 324); that meals should be taken at regular and not too long intervals; that warm drinks, stimulants and tobacco should be avoided; that early and regular hours should be kept, with a cold or chilled sponge bath every morning; and that measures should be taken to obtain a fair amount of exercise, and to provide suitable occupation for both body and mind during the day. *Medicines.* Arnica montana for persons who are nervous and irritable, and suffer much from headache; Bryonia for persons who are bilious and subject to rheumatism, and those who are listless and disinclined to eat, and have an unpleasant bitter taste in the mouth; Hepar sulphuris for chronic indigestion and costiveness, attended with tendency to vomit in the morning; Mercurius in cases of flatulence, combined with costiveness; Nux vomica for indigestion that makes itself felt from 2 a. m. to 4 a. m., or thereabouts, with loss of appetite and nausea in the morning, and for persons with a tendency to piles, and those who are engaged in sedentary occupations; Pulsatilla for women generally, and Chamomilla for children.

**FEVERS.**—For all fevers of a serious character, such as scarlet fever, typhus fever, typhoid fever, gastric fever, intermittent fever, or ague, etc., it is better to send at once for a medical man. In cases of ordinary fever indicated by alternate flushes and shivering, a hot dry skin, rapid pulse, and dry, foul tongue, the patient should have a warm bath, take but little nourishment, and drink cold water. *Medicine.* Aconitum napellus.

**FLATULENCY.**—This disorder, which arises from, and is a symptom of indigestion, frequently affects respiration, and causes disturbance and quickened action of the heart. The patient should pay attention to diet, as for dyspepsia. *Medicines.* Cina and Nux vomica; Pulsatilla for women, and Chamomilla for children. See **DYSPEPSIA**.

**HEADACHE.**—This disorder proceeds from so many various causes, which require different treatment, that it is wiser to apply at once to a regular homœopathic practitioner, and especially in headache of frequent occurrence. *Medicines.* Nux vomica when headache is caused by indigestion; Pulsatilla being useful for women; Belladonna and Ignatia, for sick headache; Aconitum napellus and Arsenicum for nervous headache.

**HEARTBURN.**—For this unpleasant sensation of heat, arising from the stomach, accompanied by a bitter taste, and sometimes by nausea, Nux vomica is a good medicine. Pulsatilla may be taken by women.

**INDIGESTION.**—See *Dyspepsia*.

**MEASLES.**—This complaint, which seldom attacks adults, is indicated in its early stage by the usual accompaniments and signs of a severe cold in the head—namely, sneezing, running from the nose and eyelids, which are swollen. The sufferer also coughs, does not care to eat, and feels sick and restless. About four days after the first appearance of these premonitory symptoms, a red rash comes out over the face, neck and body, which dies away, and finally disappears in about five days. The patient should be kept warm, and remain in one room during the continuance of the disorder, and especially while the rash is out, lest, through exposure to cold in any way, the rash may be checked and driven inwards. *Medicines.* Aconitum napellus, and Pulsatilla, which are sufficient for all ordinary cases. If there be much fever, Belladonna; and if the rash be driven in by a chill, Bryonia.

## HOMŒOPATHIC REMEDIES.

**MUMPS.**—This disorder is sometimes consequent on measles. It is indicated by the swelling of the glands under the ear and lower jaw. It is far more painful than dangerous. Fomenting with warm water is useful. *Medicines.* Mercurius generally; Belladonna may be used when mumps follow an attack of measles.

**NETTLERASH.**—This rash, so called because in appearance it resembles the swelling and redness caused by the sting of a nettle, is generally produced by a disordered state of the stomach. *Medicines.* Aconitum napellus, Nuxvomica, or Pulsatilla, in ordinary cases; Arsenicum is useful if there is much fever; Belladonna if the rash is accompanied with headache.

**PILES.**—The ordinary homœopathic remedies for this painful complaint are Nuxvomica and Sulphur.

**SPRAINS.**—Apply to the part affected a lotion of one part of tincture of Arnica to two of water. For persons who cannot use Arnica, in consequence of the irritation produced by it, a lotion of tincture of Calendula may be used in the proportion of one part of the tincture to four of water.

**TEETHING.**—Infants and very young children frequently experience much pain in the mouth during dentition, and especially when the tooth is making its way through the gum. The child is often feverish, the mouth and gums hot and tender, and the face flushed. There is also much running from the mouth, and the bowels are disturbed, being in some cases confined, and in others relaxed, approaching to diarrhœa. *Medicines.* These are Aconitum napellus, in ordinary cases; Nuxvomica, when the bowels are confined; Chamomilla, when the bowels are relaxed; Mercurius, if the relaxed state of the bowels has deepened into diarrhœa; Belladonna, if there be symptoms of disturbance of the brain.

**WHOOPIING COUGH.**—This disease is sometimes of long duration, for if it shows itself in the autumn or winter months, the little patient will frequently retain cough until May or even June, when it disappears with return of warmer weather. Change of air when practicable is desirable, especially when the cough has been of long continuance. In this cough there are three stages. In the first the symptoms are those of an ordinary cold in the head and cough. In the second the cough becomes hard, dry and rapid, and the inhalation of the air, after or during the paroxysm of the coughing, produces a peculiar sound from which the disease is named. In the final stage the cough occurs at longer intervals, and the paroxysms are less violent and ultimately disappear. In this stage the disease is subject to fluctuation, the cough again increasing in frequency of occurrence and intensity if the patient has been unduly exposed to cold or damp, or if the weather is very changeable. Children suffering from whooping-cough should have a light nourishing diet and only go out when the weather is mild and warm. *Medicines.* Aconitum napellus in the very commencement of the disorder, followed by Ipecacuanha and Nuxvomica when the second stage is just approaching and during its continuance. These medicines may be continued if necessary during the third stage.

**WORMS.**—The presence of worms is indicated by irritation of the membrane of the nose, causing the child to thrust its finger into the nostrils; by irritation of the lower part of the body; by thinness, excessive appetite and restlessness in sleep. Children suffering from worms should eat meat freely and not take so much bread, vegetables, and farinaceous food as children generally do. They should have as much exercise as possible in the open air, and be sponged with cold water every morning. The worms that mostly trouble children are the thread worms, which are present chiefly in the lower portion of the intestines, and the round worm. *Medicine, &c.* Administer an injection of weak salt-and-water, and give Aconitum napellus, to be followed by Ignatia and Sulphur in the order in which they are here given. These are the usual remedies for thread worms. For round worms, whose presence in the stomach is indicated by great thinness, sickness and discomfort, and pain in the stomach, Aconitum napellus, Cina, Ignatia, and Sulphur are given.

**EXTENT OF DOSES IN HOMŒOPATHY.**—Homœopathic medicines are given in the form of globules, pilules, or tincture, the last-named being

## ARTIFICIAL FEEDING OF INFANTS.

generally preferred. The average doses for adults are from half a drop to one drop of the tincture given in a tablespoonful of water, from two to four pilules, or from three to six globules. In using the tincture it is usual to measure out a few tablespoonfuls of water and to add to it a certain number of drops regulated by the quantity of water that is used. For children medicine is mixed at the same strength, but a less quantity is given. The proper quantity for a dose is always given in books and manuals for the homœopathic treatment of disease. Small cases of the principal medicines used in homœopathy can be procured from most druggists, and with each case a little book showing the symptoms and treatment of all ordinary complaints is usually given.

**DIET IN HOMŒOPATHY.**—The articles of food that are chiefly recommended when attention to diet is necessary are stale bread, beef, mutton, poultry, fresh game, fish, chiefly cod and flat fish, avoiding mackerel, etc., eggs and oysters. Rice, sago, tapioca, and arrowroot are permitted, as are also potatoes, carrots, turnips, broccoli, cauliflower, asparagus, French beans, and broad beans. Water, milk, cocoa and chocolate may be drunk. It is desirable to avoid all things that are not specified in the foregoing list. Ripe fruit may be eaten, but unripe fruit, unless cooked, should be scrupulously avoided.

## ARTIFICIAL FEEDING OF INFANTS.

The following formula, by a physician of high standing, has been found beneficial in numerous cases where everything else failed to produce satisfactory results. In the author's own family, it saved the life of an infant daughter who had been given up by an old practitioner, but who, it seems, was dying simply from lack of proper nourishment. She is now a rosy, robust child, in perfect health, and the pet of the household. The virtue of this formula consists in the fact that it most nearly corresponds to the natural nourishment from a healthy mother's breast. In using this formula care should be taken to use only absolutely pure water, and all bottles and vessels should be scrupulously clean. The cream and milk should be from *one* cow only:

Take two tablespoonfuls of cream, two tablespoonfuls of lime water, one tablespoonful of good milk, three tablespoonfuls of a solution of sugar of milk containing eighteen drams to one pint of pure water.

This quantity warmed is enough for once feeding a child of four months. For an older child add one teaspoonful of milk to the mixture for each month over four. For a younger child, diminish the quantity of milk in the same ratio.

The child should be fed every two hours and a half during the day and evening and as little as possible at night.

If the child be constipated, substitute barley water for lime water. In preparing the barley water a porcelain-lined kettle should be employed if possible. Use best pearl barley, and boil to a very thin gruel, which strain.

Each feeding must, of course, be made fresh, although the barley water and the sugar-of-milk solution may be made in quantities.

**CHOLERA MIXTURE**—Take equal parts of tincture of cayenne, tincture of opium, tincture of rhubarb, essence of peppermint, and spirits of camphor. Mix well. Dose, 15 to 30 drops in a wine-glass of water, according to age and violence of the attack. Repeat every fifteen or twenty minutes until relief is obtained.

**CURE FOR HICCOUGH**—Sit erect and inflate the lungs fully. Then, retaining the breath, bend forward slowly until the chest

## CONTAGIOUS DISEASES.

meets the knees. After slowly arising again to the erect position, slowly exhale the breath. Repeat this process a second time, and the nerves will be found to have received an access of energy that will enable them to perform their natural functions.

**CHOKING**—A piece of food lodged in the throat may sometimes be pushed down with the finger, or removed with a hair-pin quickly straightened and hooked at the end, or by two or three vigorous blows on the back between the shoulders.

### Contagious Diseases.

The following points will help to determine the nature of a suspicious illness:

DISEASE.	Rash or Eruption.	Appearance.	Duration in days.	Remarks
CHICKEN-POX...	Small rose pimples changing to vesicles .....	2d day of fever or after 24 h'rs' illness.....	6-7	Scabs from about fourth day of fever.
ERYSIPELAS....	Diffuse redness and swelling.....	2d or 3d day of illness.....		
MEASLES.....	Small red dots like flea bites .....	4th day of fever or after 72 hours' illness..	6-10	Rash fades on 7th day.
SCARLET FEVER.	Bright scarlet, diffused.....	2d day of fever or after 24 hours' illness..	8-10	Rash fades on 5th day.
SMALL-POX.....	Small red pimples changing to vesicles, then pustules	3d day of fever or after 48 hours' illness..	14-21	Scabs form 9th or 10th day, fall off about 14th.
TYPHOID FEVER.	Rose-colored spots scattered .....	11th to 14th day.	22-30	Accompanied by diarrhoea.

It will often relieve a mother's anxiety to know how long there is danger of infection after a child has been exposed to a contagious disease. The following table gives the information concerning the more important diseases:

DISEASE.	Symptoms appear.	Period ranges from	Patient is Infectious.
CHICKEN-POX.....	On 14th day	10-18 days	Until all scabs have fallen off.
DIPHTHERIA.....	" 2d day	2-5 days	14 d's after disappearance of membrane.
MEASLES*.....	" 14th day	10-14 days	Until scaling and cough have ceased.
MUMPS.....	" 19th day	16-24 days	14 days from commencement.
ROTHELN.....	" 14th day	12-20 days	10-14 days from commencement.
SCARLET FEVER.....	" 4th day	1-7 days	Until all scaling has ceased.
SMALL-POX.....	" 12th day	1-14 days	Until all scabs have fallen off.
TYPHOID FEVER.....	" 21st day	1-28 days	Until diarrhoea ceases.
WHOOPING COUGH..	" 14th day	7-14 days	Six weeks from beginning to whoop.

\*In measles the patient is infectious three days before the eruption appears.

†In whooping-cough the patient is infectious during the primary cough, which may be three weeks before the whooping begins.

# ACCIDENTS AND EMERGENCIES.

## WHAT TO DO.

*If an artery is cut, red blood spurts. Compress it above the wound. If a vein is cut, dark blood flows. Compress it below and above.*

*If choked, go upon all fours and cough.*

*For slight burns, dip the part in cold water; if the skin is destroyed, cover with varnish or linseed oil.*

*For apoplexy, raise the head and body; for fainting, lay the person flat.*

*Send for a physician when a serious accident of any kind occurs, but treat as directed until he arrives.*

**SCALDS AND BURNS**—The following facts cannot be too firmly impressed on the mind of the reader, that in either of these accidents the *first, best, and often the only remedies required*, are sheets o' wadding, fine wool, or carded cotton, and in the default of these, violet powder, flour, magnesia, or chalk. The object for which these several articles are employed is the same in each instance; namely, to exclude the air from the injured part; for if the air can be effectually shut out from the raw surface, and care is taken not to expose the tender part till the new cuticle is formed, the cure may be safely left to nature. The moment a person is called to a case of scald or burn, he should cover the part with a sheet, or a portion of a sheet, of wadding, taking care not to break any blister that may have formed, or stay to remove any burnt clothes that may adhere to the surface, but as quickly as possible envelop every part of the injury from all access of the air, laying one or two more pieces of wadding on the first, so as effectually to guard the burn or scald from the irritation of the atmosphere; and if the article used is wool or cotton, the same precaution, of adding more material where the surface is thinly covered, must be adopted; a light bandage finally securing all in their places. Any of the popular remedies recommended below may be employed when neither wool, cotton, nor wadding are to be procured, it being always remembered that that article which will best exclude the air from a burn or scald is the best, quickest, and least painful mode of treatment. And in this respect nothing has surpassed cotton loose or attached to paper as in wadding.

*If the Skin is Much Injured* in burns, spread some linen pretty thickly with chalk ointment, and lay over the part, and give the patient some brandy and water if much exhausted; then send for a medical man. If not much injured, and very painful, use the same ointment, or apply carded cotton dipped in lime water and linseed oil. If you please, you may lay cloths dipped in ether over the parts, or cold lotions. Treat scalds in same manner, or cover with scraped raw potato; but the chalk ointment is the best. In the absence of all these, cover the injured part with treacle, and dust over it plenty of flour.

**BODY IN FLAMES**—Lay the person down on the floor of the room, and throw the table cloth, rug, or other large cloth over him, and roll him on the floor.

**DIRT IN THE EYE**—Place your forefinger upon the cheek-bone, having the patient before you; then slightly bend the finger, this will draw down the lower lid of the eye, and you will probably be able to remove the dirt; but if this will not enable you to get at it, repeat this operation while you have a netting-needle or bodkin placed over the eyelid; this will turn it inside out, and enable you to remove the sand, or eyelash, etc., with the corner of a fine silk handkerchief. As soon as the substance is removed, bathe the eye with cold water, and exclude the light for a day. If the inflammation is severe, let the patient use a refrigerant lotion.

**LIME IN THE EYE**—Syringe it well with warm vinegar and water in the proportion of one ounce of vinegar to eight ounces of water; exclude light.

## ACCIDENTS AND EMERGENCIES.

**IRON OR STEEL SPICULÆ IN THE EYE**—These occur while turning iron or steel in a lathe, and are best remedied by doubling back the upper or lower eyelid, according to the situation of the substance, and with the flat edge of a silver probe, taking up the metallic particle, using a lotion made by dissolving six grains of sugar of lead and the same of white vitriol, in six ounces of water, and bathing the eye three times a day till the inflammation subsides. Another plan is—Drop a solution of sulphate of copper (from one to three grains of the salt to one ounce of water) into the eye, or keep the eye open in a wineglassful of the solution. Bathe with cold lotion, and exclude light to keep down inflammation.

**DISLOCATED THUMB**—This is frequently produced by a fall. Make a clove hitch, by passing two loops of cord over the thumb, placing a piece of rag under the cord to prevent it cutting the thumb; then pull in the same line as the thumb. Afterwards apply a cold lotion.

**CUTS AND WOUNDS**—Clean cut wounds, whether deep or superficial, and likely to heal by the first intention, should always be washed or cleaned, and at once evenly and smoothly closed by bringing both edges close together, and securing them in that position by adhesive plaster. Cut thin strips of sticking plaster, and bring the parts together; or if large and deep, cut two broad pieces, so as to look like the teeth of a comb, and place one on each side of the wound, which must be cleaned previously. These pieces must be arranged so that they shall interlace one another; then, by laying hold of the pieces on the right side with one hand, and those on the other side with the other hand, and pulling them from one another, the edges of the wound are brought together without any difficulty.

**Ordinary Cuts** are dressed by thin strips, applied by pressing down the plaster on one side of the wound, and keeping it there and pulling in the opposite direction; then suddenly depressing the hand when the edges of the wound are brought together.

**CONTUSIONS** are best healed by laying a piece of folded lint, well wetted with extract of lead, or boracic acid, on the part, and, if there is much pain, placing a hot bran poultice over the dressing, repeating both, if necessary, every two hours. When the injuries are very severe, lay a cloth over the part, and suspend a basin over it filled with cold lotion. Put a piece of cotton into the basin, so that it shall allow the lotion to drop on the cloth, and thus keep it always wet.

**HEMORRHAGE**, when caused by an artery being divided or torn, may be known by the blood issuing out of the wound in leaps or jerks, and being of a bright scarlet color. If a vein is injured, the blood is darker and flows continuously. To arrest the latter, apply pressure by means of a compress and bandage. To arrest arterial bleeding, get a piece of wood (part of a broom handle will do), and tie a piece of tape to one end of it; then tie a piece of tape loosely over the arm, and pass the other end of the wood under it; twist the stick round and round until the tape compresses the arm sufficiently to arrest the bleeding, and then confine the other end by tying the string around the arm. A compress made by enfolding a penny piece in several folds of lint or linen should, however, be first placed under the tape and over the artery. If the bleeding is very obstinate, and it occurs in the *arm*, place a cork underneath the string, on the inside of the fleshy part, where the artery may be felt beating by any one; if in the *leg*, place a cork in the direction of a line drawn from the inner part of the knee towards the outer part of the groin. It is an excellent thing to accustom yourself to find out the position of these arteries, or, indeed, any that are superficial, and to explain to every person in your house where they are, and how to stop bleeding. If a stick cannot be got take a handkerchief, make a cord bandage of it, and tie a knot in the middle; the knot acts as a compress, and should be placed over the artery, while the two ends are to be tied around the thumb. Observe *always to place the ligature between the wound and the heart*. Putting your finger into a bleeding wound, and making pressure until a surgeon arrives, will generally stop violent bleeding.

**BLEEDING FROM THE NOSE**, from whatever cause, may generally be stopped by putting a plug of lint into the nostrils; if this does not do, apply a

## ACCIDENTS AND EMERGENCIES.

cold lotion to the forehead; raise the head, and place over it both arms, so that it will rest on the hands; dip the lint plug, *slightly moistened*, into some powdered gum arabic, and plug the nostrils again; or dip the plug into equal parts of powdered gum arabic and alum, and plug the nose. Or the plug may be dipped in Friar's balsam, or tincture of kino. Heat should be applied to the feet; and, in obstinate cases, the sudden shock of a cold key, or cold water poured down the spine, will often instantly stop the bleeding. If the bowels are confined take a purgative. Injections of alum solution from a small syringe into the nose will often stop hemorrhage.

**VIOLENT SHOCKS** will sometimes stun a person, and he will remain unconscious. Untie strings, collars, etc.; loosen anything that is tight, and interferes with the breathing; raise the head; see if there is bleeding from any part; apply smelling-salts to the nose, and hot bottles to the feet.

**IN CONCUSSION**, the surface of the body is cold and pale, and the pulse weak and small, the breathing slow and *gentle*, and the pupil of the eye generally contracted or small. You can get an answer by speaking loud, so as to arouse the patient. Give a little brandy and water, keep the place quiet, apply warmth, and do not raise the head too high. If you tickle the feet the patient feels it.

**IN COMPRESSION OF THE BRAIN** from any cause, such as apoplexy, or a piece of fractured bone pressing on it, there is loss of sensation. If you tickle the feet of the injured person he does not feel it. You cannot arouse him so as to get an answer. The pulse is slow and labored; the breathing deep, labored, and *snorting*; the pupil enlarged. Raise the head, loosen strings or tight things, and send for a surgeon. If one cannot be got at once, apply mustard poultices to the feet and thighs, leeches to the temples, and hot water to the feet.

**CHOKING**—When a person has a fish bone in the throat, insert the forefinger, press upon the root of the tongue, so as to induce vomiting; if this does not do, let him swallow a *large piece* of potato or soft bread; and if these fail, give a mustard emetic.

**FAINING, HYSTERICS, ETC.**—Loosen the garments, bathe the temples with water or eau-de-Cologne; open the window, admit plenty of fresh air, dash cold water on the face, apply hot bricks to the feet, and avoid bustle and excessive sympathy.

**DROWNING**—Attend to the following *essential rules*:—1. Lose no time. 2. Handle the body gently. 3. Carry the body face downwards, with the head gently raised, and never hold it up by the feet. 4. Send for medical assistance immediately, and in the meantime act as follows: 5. Strip the body; rub it dry, then wrap it in hot blankets, and place it in a warm bed in a warm room. 6. Cleanse away the froth and mucus from the nose and mouth. 7. Apply warm bricks, bottles, bags of sand, etc., to the armpits, between the thighs, and to the soles of the feet. 8. Rub the surface of the body with the hands inclosed in warm, dry worsted socks. 9. If possible, put the body into a warm bath. 10. To restore breathing, put the pipe of a common bellows into one nostril, carefully closing the other, and the mouth; at the same time drawing downwards, and pushing gently backwards, the upper part of the windpipe, to allow a more free admission of air; blow the bellows gently, in order to inflate the lungs, till the breast be raised a little; then set the mouth and nostrils free, and press gently on the chest; repeat this until signs of life appear. The body should be covered the moment it is placed on the table, except the face, and all the rubbing carried on under the sheet or blanket. When they can be obtained, a number of tiles or bricks should be made tolerably hot in the fire, laid in a row on the table, covered with a blanket, and the body placed in such a manner on them that their heat may enter the spine. When the patient revives, apply smelling-salts to the nose, give warm wine or brandy and water. *Cautions*.—1. Never rub the body with salt or spirits. 2. Never roll the body on casks. 3. Continue the remedies for twelve hours without ceasing.

**HANGING**—Loosen the cord, or whatever it may be by which the person has been suspended. Open the temporal artery or jugular vein, or bleed from the arm; employ electricity, if at hand, and proceed as for drowning, taking the additional precaution to apply eight or ten leeches to the temples.

## POISONS AND THEIR ANTIDOTES.

**APPARENT DEATH FROM DRUNKENNESS**—Raise the head; loosen the clothes, maintain warmth of surface, and give a mustard emetic as soon as the person can swallow.

**APOPLEXY AND FITS GENERALLY**—Raise the head; loosen all tight clothes, strings, etc.; apply cold lotions to the head, which should be shaved; apply leeches to the temples, bleed, and send for a surgeon.

**SUFFOCATION FROM NOXIOUS GASES, ETC.**—Remove to the fresh air; dash cold vinegar and water in the face, neck, and breast; keep up the warmth of the body; if necessary, apply mustard poultices to the soles of the feet and to the spine, and try artificial respirations as in drowning, with electricity.

**LIGHTNING AND SUNSTROKE**—Treat the same as apoplexy.

## POISONS AND THEIR ANTIDOTES.

Always send immediately for a medical man. Save all fluids vomited, and articles of food, cups, glasses, etc., used by the patient before taken ill, and lock them up.

As a rule give emetics after poisons that cause sleepiness and raving;—chalk, milk, eggs, butter, and warm water, or oil, after poisons that cause vomiting and pain in the stomach and bowels, with purging; and when there is no inflammation about the throat, tickle it with a feather to excite vomiting.



Vomiting may be caused by giving warm water, with a teaspoonful of mustard to the tumblerful, well stirred up. Sulphate of zinc (white vitriol) may be used in place of the mustard, or powdered alum. Powder of ipecacuanha, a teaspoonful rubbed up with molasses, may be employed for children. *Tartar emetic should never be given*, as it is excessively depressing, and uncontrollable in its effects. The stomach pump can only be used by skillful hands, and even then with caution.

**Opium and other Narcotics**—After vomiting has occurred, cold water should be dashed over the face and head. The patient must be kept awake, walked about between two strong persons, made to grasp the handles of a galvanic battery, dosed with strong coffee, and vigorously slapped. *Belladonna* is an antidote for opium and for morphia, etc., its active principles; and, on the other hand, the latter counteract the effects of belladonna. But a knowledge of medicine is necessary for dealing with these articles.

**Strychnia**—After emetics have been freely and successfully given, the patient should be allowed to breathe the vapor of sulphuric ether, poured on a handkerchief and held to the face, in such quantities as to keep down the tendency to convulsions. Bromide of potassium, twenty grains at a dose, dissolved in syrup, may be given every hour.

**Alcoholic Poisoning** should be combated by emetics, of which the sulphate of zinc, given as above directed, is the best. After that, strong coffee internally, and stimulation by heat externally, should be used.

**Acids** are sometimes swallowed by mistake. Alkalies, lime water, magnesia, or common chalk mixed with water, may be freely given, and afterward mucilaginous drinks, such as thick gum water or flaxseed tea.

**Alkalies** are less frequently taken in injurious strength or quantity, but sometimes children swallow lye by mistake. Common vinegar may be given freely, and then castor or sweet oil in full doses—a tablespoonful at a time, repeated every half hour or two.

**Nitrate of silver** when swallowed is neutralized by common table salt freely given in solution in water.



## DOSES OF MEDICINE.

The salts of *mercury* or *arsenic* (often kept as bedbug poison), which are powerful irritants, are apt to be very quickly fatal. Milk or the whites of eggs may be freely given, and afterward a very thin paste of flour and water. In these cases an emetic is to be given *after* the poison is neutralized.

*Phosphorus* paste, kept for roach poison or in parlor matches, is sometimes eaten by children, and has been willfully taken for the purpose of suicide. It is a powerful irritant. The first thing to be done is to give freely of *magnesia* and water; then to give mucilaginous drinks, as flaxseed tea, gum water or sassafras pith and water; and lastly to administer finely-powdered bone-charcoal, either in pill or in mixture with water.

In no case of poisoning should there be any avoidable delay in obtaining the advice of a physician, and, meanwhile, the friends or bystanders should endeavor to find out exactly what has been taken, so that the treatment adopted may be as prompt and effective as possible.

## DOSES OF MEDICINE.

NAME OF DRUG.	DOSE.	NAME OF DRUG.	DOSE.
Aloes .....	3 to 15 grains.	Syrup of Sarsaparilla..	1 to 4 teasp'fuls.
Anise Oil .....	5 to 15 drops.	“ Seneka.....	1 to 2 teasp'fuls.
Aqua Ammonia(dilute)	10 to 30 drops.	“ Rhubarb.....	1 to 2 teasp'fuls.
Balsam Copaiba.....	10 to 40 drops.	Tannic Acid.....	1 to 5 grains.
Balsam of Fir.....	3 to 10 drops.	Tinct. of Aconite Root	1 to 5 drops.
Bismuth. ....	5 to 40 grains.	“ Aloes.....	1 to 8 teasp'fuls.
Bromide of Potassium.	5 to 40 grains.	“ Asafetida ...	½ to 1 teasp'ful.
Buchu Leaves.....	20 to 40 grains.	“ Belladonna....	10 to 30 drops.
Calomel (as alterative)	1-12 to 1 grain.	“ Bloodroot.....	¼ to ½ teasp'ful.
Castor Oil.....	1 to 8 teasp'fuls.	“ Columbo ....	1 to 2 teasp'fuls.
Citrate of Iron.....	2 to 5 grains.	“ Camphor.....	5 to 60 drops.
Citrate Iron & Quinine	3 to 8 grains.	“ Cayenne.....	10 to 60 drops.
Cream of Tartar.....	½ to 3 teasp'fuls.	“ Castor.....	½ to 1 teasp'ful.
Dover's Powder.....	5 to 10 grains.	“ Catechu.....	½ to 2 teasp'fuls.
Elecampane.....	20 to 60 grains.	“ Cinch. Comp ½	to 4 teasp'fuls.
Epsom Salts.....	½ to 1 ounce.	“ Colchicum.....	15 to 60 drops.
Gallic Acid.....	5 to 10 grains.	“ Digitalis.....	5 to 20 drops.
Iodide of Potassium...	2 to 10 grains.	“ Ginger.....	¼ to 1 teasp'ful.
Kino.....	10 to 30 grains.	“ Gentian Com ½	to 2 teasp'fuls.
Mandrake .....	5 to 20 grains.	“ Guaiac.....	½ to 1 teasp'ful.
Mercury with Chalk..	2 to 8 grains.	“ Kino.....	½ to 2 teasp'fuls.
Morphine .....	¼ to ½ grain.	“ Lobelia.....	¼ to 1 teasp'ful.
Muriate of Ammonia..	5 to 20 grains.	“ Muriate Iron.	10 to 30 drops.
Opium.....	½ to 2 grains.	“ Myrrh.....	½ to 1 teasp'ful.
Paregoric.....	1 teaspoonful.	“ Nux Vomica.	5 to 10 drops.
Peppermint Essence..	5 to 30 drops.	“ Opium	
Pepsin .....	1 to 5 grains.	(Laudanum)	10 to 25 drops.
Quinine.....	1 to 10 grains.	“ Rhubarb.....	1 to 4 teasp'fuls.
Rochelle Salts.....	½ to 1 ounce.	“ “ & Senna	1 to 4 teasp'fuls.
Rhubarb.....	5 to 30 grains.	“ Tolu.....	½ to 1 teasp'ful.
Saltpetre.....	5 to 20 grains.	“ Valerian.....	½ to 2 teasp'fuls.
Samonin.....	2 to 5 grains.	Turpentine.....	10 to 40 drops.
Syrup of Squills .....	½ to 1 teasp'ful.	Wine Ipecac (Diaph.)	10 to 30 drops.
“ Iodide of Iron	15 to 30 drops.	“ “ (Emetic).	2 to 8 teasp'fuls.
“ Senna.....	1 to 6 teasp'fuls.	“ Colchicum Root	10 to 30 drops.

### Table of Proportionate Doses.

Age, years.....	80	65	50	25-40	20	16	12	8	5	2
Doses.....	$\frac{8}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{6}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$
Age, months.....							12	6	2	1
Doses.....							$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$

## Largest Safe Doses of Poisonous Drugs.

Every person should know the largest doses, which is safe to take, of active medicines. The following table shows the largest doses admissible, in grammes, and also the equivalent in grains for solids, and in minims for liquids. The doses are expressed in fractions, thus: 1-13, 1-64, meaning one-thirteenth, one-sixty-fourth. In non professional hands it is the safest plan to strictly observe the rule of never giving the maximum dose of any medicine:

Medicines.	Grammes.	Grains.	Medicines.	Grammes.	Grains.
Arsenious Acid.....	.005	1-13	Ext. Opium.....	.1	1½
Acid, Carbolic.....	.05	¾	"    Stramon. Seed.....	.05	¾
"    Hydrocyanic.....	.06	1	Fowler's Solution.....	.4	6 min.
Aconita.....	.0041	1-16	Lead, Sugar of.....	.06	9-10
Aconite Root.....	.15	2¼	Mercury, Corrosive Chlor..	.03	9-20
Arsenic, Iodide.....	.025	¾	"    Red Iodide.....	.03	9-20
Atropia.....	.01	1-64	Morphia and its Salts.....	.13	9-20
Atropia Sulph.....	.001	1-64	Nitrate Silver.....	.13	9-20
Barium, Chlor.....	.12	1¾	Oil, Croton.....	.06	9-10
Belladonna, Herb.....	.2	3	Opium.....	.15	2¼
"    Root.....	.1	1½	Phosphorus.....	.015	2-9
Codia.....	.05	¾	Potassa, Arsenite.....	.005	1-13
Conia.....	.001	1-64	"    Cyanide.....	.03	9-20
Digitalis.....	.3	4½	Santonine.....	.1	1½
Ext Aconite Leaves.....	.1	1½	Soda, Arsenite.....	.005	1-13
"    Root.....	.025	¾	Strychnia and Salts.....	.01	1-6
"    Belladonna.....	.1	1½	Tartar Emetic.....	.2	3
"    Cannabis Indica.....	.1	1½	Veratria.....	.005	1-13
"    Conium.....	.18	2¾	Veratrum Viride.....	.3	4½
"    Digitalis.....	.2	3	Zinc, Chloride.....	.015	2-9
"    Nux Vomica, Alc.....	.05	¾	"    Valeriane.....	.06	9-10

## Relative Value of Food (Beef par)

Oysters, 22; milk, 24; lobsters, 50; cream, 56; codfish, 68; eggs, 72; turbot, 84; mutton, 87; venison, 89; veal, 92; fowl, 94; herring, 100; beef, 100; duck, 104; salmon, 108; pork, 116; butter, 124; cheese, 155.

## Percentage of Carbon in Food.

Cabbage, 3; beer, 4; carrots, 5; milk, 7; parsnips, 8; fish, 9; potatoes, 12; eggs, 16; beef, 27; bread, 27; cheese, 36; peas, 36; rice, 38; corn, 38; biscuit, 42; oatmeal, 42; sugar, 42; flour, 46; bacon, 54; cocoa, 69; butter, 79.

## Foot-tons of Energy Per Ounce of Food.

Cabbage, 16; carrots, 20; milk, 24; ale, 30; potatoes, 38; porter, 42; beef, 55; egg, 57; ham, 65; bread, 83; egg (yolk), 127; sugar, 130; rice, 145; flour, 148; arrowroot, 151; oatmeal, 152; cheese, 168; butter, 281.

## Loss of Meat in Cooking.

100 lbs. raw beef	= 67 lbs. roast	100 lbs. raw fowl	= 80 roast
100 " " "	= 74 " boiled	100 " " "	= 87 boiled
400 " raw mutton	= 75 " roast	100 " raw fish	= 94 boiled

## The Percentage of Starch.

In common grains is as follows, according to Prof. Yeomans: Rice flour, 84 to 85; Indian meal, 77 to 80; oatmeal, 70 to 80; wheat flour, 39 to 77; barley flour, 67 to 70; rye flour, 50 to 61; buckwheat, 52; peas and beans, 42 to 43; potatoes (75 per cent. water), 13 to 15.

## The Degrees of Sugar.

In various fruits are: Peach, 1.6; raspberry, 4.0; strawberry, 5.7; currant, 6.1; gooseberry, 7.2; apple, 7.9; mulberry, 9.2; pear, 9.4; cherry, 10.8; grape, 14.9.

## Digestion of Various Foods.

**Easy of Digestion**—Arrowroot, asparagus, cauliflower, baked apples, oranges, grapes, strawberries, peaches.

**Moderately Digestible**—Apples, raspberries, bread, puddings, rhubarb, chocolate, coffee, porter.

**Hard to Digest**—Nuts, pears, plums, cherries, cucumbers, onions, carrots, parsnips.

### TIME REQUIRED FOR DIGESTION.

	Hrs.	Min.		Hrs.	Min.
Apples, sweet.....	1	30	Mutton, roast.....	3	15
"    sour.....	2	00	"    broiled.....	3	00
Beans, pod, boiled.....	2	30	"    boiled.....	3	00
Beef, fresh, rare, roasted.....	3	00	Oysters, raw.....	2	55
"    dried.....	3	30	"    roast.....	3	15
"    fried.....	4	00	"    stewed.....	3	30
Beets, boiled.....	3	45	Pork, fat and lean, roast.....	5	15
Bread, wheat, fresh.....	3	30	"    "    "    boiled.....	3	15
"    corn.....	3	15	"    "    "    raw.....	3	00
Butter (melted).....	3	30	Potatoes, boiled.....	3	30
Cabbage, with vinegar, raw.....	2	00	"    baked.....	2	30
"    boiled.....	4	30	Rice boiled.....	1	00
Cheese (old, strong).....	3	30	Sago ".....	1	45
Codfish.....	2	00	Salmon, salted, boiled.....	4	00
Custard, baked.....	2	45	Soup, beef, vegetable.....	4	00
Ducks, domestic, roasted.....	4	00	"    chicken boiled.....	3	00
"    wild, ".....	4	30	"    oyster ".....	3	30
Eggs, fresh, hard, boiled.....	3	30	Tapioca, boiled.....	2	00
"    "    soft.....	3	00	Tripe, soured, boiled.....	1	00
"    fried.....	3	30	Trout, fresh, boiled or fried.....	1	30
Goose, roast.....	2	00	Turkey, domestic, roast.....	2	00
Lamb, fresh, boiled.....	2	30	"    wild, roast.....	2	18
Liver, beef, boiled.....	2	00	Turnips, boiled.....	3	30
Milk, boiled.....	2	00	Veal, fresh, broiled.....	4	00
"    raw.....	2	15	"    fresh, fried.....	4	30
Parsnips, boiled.....	2	30	Venison steak, broiled.....	1	35

## Fat, Water and Muscle Properties of Food.

100 PARTS.	Water.	Muscle.	Fat.	100 PARTS.	Water.	Muscle.	Fat.
Cucumbers.....	97.0	1.5	1.0	Mutton.....	44.0	12.5	40.0
Turnips.....	94.4	1.1	4.0	Pork.....	38.5	10.00	50.0
Cabbage.....	90.0	4.0	5.0	Beans.....	14.8	24.0	57.7
Milk, cows'.....	86.0	5.0	8.0	Buckwheat.....	14.2	8.6	75.4
Apples.....	84.0	5.0	10.0	Barley.....	14.0	15.0	68.8
Eggs, yolk of.....	79.0	15.0	27.0	Corn.....	14.0	12.0	73.0
Potatoes.....	75.2	1.4	22.5	Peas.....	14.0	23.4	60.0
Veal.....	68.5	10.1	1.65	Wheat.....	14.0	14.6	69.4
Eggs, white of.....	53.0	17.0	.0	Oats.....	13.6	17.0	66.4
Lamb.....	50.5	11.0	35.0	Rice.....	13.5	6.5	79.5
Beef.....	50.0	15.0	30.0	Cheese.....	10.0	65.0	19.0
Chicken.....	46.0	18.0	32.0	Butter.....			100.0

## Percentage of Nutrition in Various Articles of Food.

Raw cucumbers, 2; raw mellons, 3; boiled turnips,  $4\frac{1}{2}$ ; milk, 7; cabbage,  $7\frac{1}{2}$ ; currants, 10; whipped eggs, 13; beets, 14; apples, 16; peaches, 20; boiled codfish, 21; broiled venison, 22; p. tatoes,  $22\frac{1}{2}$ ; fried veal, 24; roast pork, 24; roast poultry, 26; raw beef, 26; raw grapes, 27; raw plums, 29; broiled mutton, 30; oatmeal porridge, 75; rye bread, 79; boiled beans, 87; boiled rice, 88; barley bread, 88; wheat bread, 90; baked corn bread, 91; boiled barley, 92; butter, 93; boiled peas, 93; raw oils, 94.

# USEFUL RECIPES, TRADE SECRETS, ETC.

**Toothache Cure.** Compound tinct. benzoin is said to be one of the most certain and speedy cures for toothache; pour a few drops on cotton, and press at once into the diseased cavity, when the pain will almost instantly cease.

**Toothache Tincture.** Mix tannin, 1 scruple; mastic, 3 grains; ether, 2 drams. Apply on cotton wool, to the tooth, previously dried.

**Charcoal Tooth Paste.** Chlorate of potash,  $\frac{1}{2}$  dram; mint water, 1 ounce. Dissolve and add powdered charcoal, 2 ounces; honey, 1 ounce.

**Excellent Mouth Wash.** Powdered white Castile soap, 2 drams; alcohol, 3 ounces; honey, 1 ounce; essence or extract jasmine, 2 drams. Dissolve the soap in alcohol and add honey and extract.

**Removing Tartar from the Teeth.** This preparation is used by dentists. Pure muriatic acid, one ounce; water, one ounce; honey, two ounces; mix thoroughly. Take a toothbrush, and wet it freely with this preparation, and briskly rub the black teeth, and in a moment's time they will be perfectly white; then immediately wash out the mouth well with water, that the acid may not act on the enamel of the teeth. This should be done only occasionally.

**Bad Breath.** Bad breath from catarrh, foul stomach, or bad teeth, may be temporarily relieved by diluting a little bromo chloralum with eight or ten parts of water, and using it as a gargle, and swallowing a few drops before going out. A pint of bromo chloralum costs fifty cents, but a small vial will last a long time.

**Good Tooth Powder.** Procure, at a druggist's, half an ounce of powdered orris root, half an ounce of prepared chalk finely pulverized, and two or three small lumps of Dutch pink. Let them all be mixed in a mortar, and pounded together. The Dutch pink is to impart a pale reddish color. Keep it in a close box.

**Another Tooth Powder.** Mix together, in a mortar, half an ounce of red Peruvian bark, finely powdered; a quarter of an ounce of powdered myrrh; and a quarter of an ounce of prepared chalk.

**A Safe Depilatory.** Take a strong solution of sulphuret of barium, and add enough finely powdered starch to make a paste. Apply to the roots of the hair and allow it to remain on a few minutes, then scrape off with the back edge of a knife blade and rub with sweet oil.

**Quick Depilatory for Removing Hair.** Best slacked lime, 6 ounces; orpiment, fine powder, 1 ounce. Mix with a covered sieve and preserve in a dry place in closely stoppered bottles. In using mix the powder with enough water to form a paste, and apply to the hair to be removed. In about five minutes, or as soon as its caustic action is felt on the skin, remove, as in shaving, with an ivory or bone paper knife, wash with cold water freely, and apply cold cream.

**Tricopherous for the Hair.** Castor oil, alcohol, each 1 pint; tinct. cantharides, one ounce; oil bergamot,  $\frac{1}{2}$  ounce; alkanet coloring, to color as wished. Mix and let it stand forty-eight hours, with occasional shaking, and then filter.

**Liquid Shampoo.** Take bay rum,  $2\frac{1}{2}$  pints; water,  $\frac{1}{2}$  pint; glycerine, 1 ounce; tinct. cantharides, 2 drams; carbonate of ammonia, 2 drams borax,  $\frac{1}{2}$  ounce; or take of New England rum,  $1\frac{1}{2}$  pints; bay rum, 1 pint; water  $\frac{1}{2}$  pint; glycerine, 1 ounce; tinct. cantharides, 2 drams; ammon. carbonate, 2 drams; borax,  $\frac{1}{2}$  ounce; the salts to be dissolved in water and the other ingredients to be added gradually.

**Cleaning Hair Brushes.** Put a teaspoonful or dessertspoonful of aqua ammonia into a basin half full of water, comb the loose hairs out of the brush, then agitate the water briskly with the brush, and rinse it well with clear water.

**Hair Invigorator.** Bay rum, two pints; alcohol, one pint; castor oil, one ounce; carb. ammonia, half an ounce; tincture of cantharides, one ounce. Mix them well. This compound will promote the growth of the hair and prevent it from falling out.

## USEFUL RECIPES, ETC.

**For Dandruff.** Take glycerine, four ounces; tincture of cantharides, five ounces; bay rum, four ounces; water, two ounces. Mix, and apply once a day, and rub well down the scalp.

**Mustache Grower.** Simple cerate, 1 ounce; oil bergamot, 10 minims; saturated tinct. of cantharides, 15 minims. Rub them together thoroughly, or melt the cerate and stir in the tincture while hot, and the oil as soon as it is nearly cold, then run into molds or rolls. To be applied as a pomade, rubbing in at the roots of the hair. Care must be used not to inflame the skin by too frequent application.

**Razor-strop Paste.** Wet the strop with a little sweet oil, and apply a little flour of emery evenly over the surface.

**Shaving Compound.** Half a pound of plain white soap, dissolved in a small quantity of alcohol, as little as can be used; add a tablespoonful of pulverized borax. Shave the soap and put it in a small tin basin or cup; place it on the fire in a dish of boiling water; when melted, add the alcohol, and remove from the fire; stir in oil of bergamot sufficient to perfume it.

**Cure for Prickly Heat.** Mix a large portion of wheat bran with either cold or lukewarm water, and use it as a bath twice or thrice a day. Children who are covered with prickly heat in warm weather will be thus effectually relieved from that tormenting eruption. As soon as it begins to appear on the neck, face, or arms, commence using the bran water on these parts repeatedly through the day, and it may probably spread no farther. If it does, the bran water bath will certainly cure it, if persisted in.

**To Remove Corns from Between the Toes.** These corns are generally more painful than any others, and are frequently situated as to be almost inaccessible to the usual remedies. Wetting them several times a day with hartshorn will in most cases cure them. Try it.

**Superior Cologne Water.** Oil of lavender, two drams; oil of rosemary, one dram and a half; orange, lemon and bergamot, one dram each of the oil; also two drams of the essence of musk, attar of rose ten drops, and a pint of proof spirit. Shake all together thoroughly three times a day for a week.

**Inexhaustible Smelling Salts.** Sal tartar, three drams; muriate ammonia, granulated, 6 drams; oil neroli, 5 minims; oil lavender flowers, 5 minims; oil rose, 3 minims; spirits ammonia, 15 minims. Put into the pungent a small piece of sponge filling about one-fourth the space, and pour on it a due proportion of the oils, then put in the mixed salts until the bottle is three-fourths full, and pour on the spirits of ammonia in proper proportion and close the bottle.

**Volatile Salts for Pungents.** Liquor ammon., fort., 1 pint, oil lavender flowers, 1 dram, oil rosemary, fine, 1 dram, oil bergamot,  $\frac{1}{2}$  dram, oil peppermint, 10 minims. Mix thoroughly and fill pungents or keep in well stoppered bottle. Another formula is, sesqui-carbonate of ammonia, small pieces, 10 ounces, concentrated liq. ammonia, 5 ounces. Put the sesqui-carb. in a wide mouth jar with air-tight stopper, perfume the liquor ammonia to suit and pour over the carbonate, close tightly the lid and place in a cool place, stir with a stiff spatula every other day for a week, and then keep it closed for two weeks, or until it becomes hard, when it is ready for use.

**Paste for Papering Boxes.** Boil water and stir in batter of wheat or rye flour. Let it boil one minute, take off and strain through a colander. Add, while boiling, a little glue or powdered alum. Do plenty of stirring while the paste is cooking, and make of consistency that will spread nicely.

**Aromatic Spirit of Vinegar.** Acetic acid, No. 8, pure, 8 ounces; camphor,  $\frac{1}{2}$  ounce. Dissolve and add oil lemon, oil lavender flowers, each two drams; oil cassia, oil cloves,  $\frac{1}{2}$  dram each. Thoroughly mix and keep in well stoppered bottle.

**Rose-Water.** Preferable to the distilled for a perfume, or for culinary purposes: Attar of rose, twelve drops; rub it up with half an ounce of white sugar and two drams carbonate of magnesia, then add gradually one quart of water and two ounces of proof spirit, and filter through paper.

## USEFUL RECIPES, ETC.

**Bay Rum.** French proof spirit, one gallon; extract bay, six ounces. Mix and color with caramel; needs no filtering.

**Fine Lavender Water.** Mix together, in a clean bottle, a pint of inodorous spirit of wine, an ounce of oil of lavender, a teaspoonful of oil of bergamot, and a tablespoonful of oil of ambergris.

**The Virtues of Turpentine.** After a housekeeper fully realizes the worth of turpentine in the household, she is never willing to be without a supply of it. It gives quick relief to burns, it is an excellent application for corns, it is good for rheumatism and sore throats, and it is the quickest remedy for convulsions or fits. Then it is a sure preventive against moths by just dropping a trifle in the bottom of drawers, chests and cupboards, it will render the garments secure from injury during the summer. It will keep ants and bugs from closets and store-rooms by putting a few drops in the corners and upon the shelves it is sure destruction to bedbugs, and will effectually drive them away from their haunts if thoroughly applied to all the joints of the bedstead in the spring cleaning time, and injures neither furniture nor clothing. A spoonful of it added to a pail of warm water is excellent for cleaning paint. A little in suds washing days lightens laundry labor.

**A Perpetual Paste** is a paste that may be made by dissolving an ounce of alum in a quart of warm water. When cold, add as much flour as will make it the consistency of cream, then stir into it half a teaspoonful of powdered resin, and two or three cloves. Boil it to a consistency of mush, stirring all the time. It will keep for twelve months, and when dry may be softened with warm water.

**Paste for Scrap Books.** Take half a teaspoonful of starch, same of flour, pour on a little boiling water, let it stand a minute, add more water, stir and cook it until it is thick enough to starch a shirt bosom. It spreads smooth, sticks well and will not mold or discolor paper. Starch alone will make a very good paste.

**A Strong Paste.** A paste that will neither decay nor become moldy. Mix good clean flour with cold water into a thick paste well blended together, then add boiling water, stirring well up until it is of a consistency that can be easily and smoothly spread with a brush; add to this a spoonful or two of brown sugar, a little corrosive sublimate and about half a dozen drops of oil of lavender, and you will have a paste that will hold with wonderful tenacity.

**A Brilliant Paste.** A brilliant and adhesive paste, adapted to fancy articles, may be made by dissolving caseine precipitated from milk by acetic acid and washed with pure water in a saturated solution of borax.

**A Sugar Paste.** In order to prevent the gum from cracking, to ten parts by weight of gum arabic and three parts of sugar, add water until the desired consistency is obtained. If a very strong paste is required, add a quantity of flour equal in weight to the gum, without boiling the mixture. The paste improves in strength when it begins to ferment.

**Tin Box Cement.** To fix labels to tin boxes either of the following will answer: 1. Soften good glue in water, then boil it in strong vinegar, and thicken the liquid while boiling with fine wheat flour, so that a paste results. 2. Starch paste, with which a little Venice turpentine has been incorporated while warm.

**Paper and Leather Paste.** Cover four parts, by weight, of glue, with fifteen parts of cold water, and allow it to soak for several hours, then warm moderately till the solution is perfectly clear, and dilute with sixty parts of boiling water, intimately stirred in. Next prepare a solution of thirty parts of starch in two hundred parts of cold water, so as to form a thin homogeneous liquid, free from lumps, and pour the boiling glue solution into it with thorough stirring, and at the same time keep the mass boiling.

**Commercial Mucilage.** The best quality of mucilage in the market is made by dissolving clear glue in equal volumes of water and strong vinegar, and adding one-fourth of an equal volume of alcohol, and a small quantity of a solution of alum in water. Some of the cheaper preparations offered for sale are merely boiled starch or flour, mixed with nitric acid to prevent their gelatinizing.

## USEFUL RECIPES, ETC.

**Acid-Proof Paste.** A paste formed by mixing powdered glass with a concentrated solution of silicate of soda makes an excellent acid-proof cement.

**Paste to Fasten Cloth to Wood.** Take a plump pound of wheat flour, one tablespoonful of powdered resin, one tablespoonful of finely powdered alum, and rub the mixture in a suitable vessel, with water, to a uniform, smooth paste; transfer this to a small kettle over a fire, and stir until the paste is perfectly homogeneous without lumps. As soon as the mass has become so stiff that the stirrer remains upright in it, transfer it to another vessel and cover it up so that no skin may form on its surface.

This paste is applied in a very thin layer to the surface of the table; the cloth, or leather, is then laid and pressed upon it, and smoothed with a roller. The ends are cut off after drying. If leather is to be fastened on, this must first be moistened with water. The paste is then applied, and the leather rubbed smooth with a cloth.

**Paste for Printing Office.** Take two gallons of cold water and one quart wheat flour, rub out all the lumps, then add one-fourth pound of finely pulverized alum and boil the mixture for ten minutes, or until a thick consistency is reached. Now add one quart of hot water and boil again, until the paste becomes a pale brown color, and thick. The paste should be well stirred during both processes of cooking. Paste thus made will keep sweet for two weeks and prove very adhesive.

**To Take Smoke Stains from Walls.** An easy and sure way to remove smoke stains from common plain ceilings is to mix wood ashes with the whitewash just before applying. A pint of ashes to a small pail of whitewash is sufficient, but a little more or less will do no harm.

**To Remove Stains from Broadcloth.** Take an ounce of pipe clay, which has been ground fine, mix it with twelve drops of alcohol and the same quantity of spirits of turpentine. Whenever you wish to remove any stains from cloth, moisten a little of the cloth with alcohol and rub it on the spots. Let it remain till dry, then wash with clean water, and the spots will disappear.

**To Remove Stains of Fruit from Linen.** Moisten the cloth with water, then rub with sulphur, then wash thoroughly, or else the

**To Remove Grease from Linen.** Take three ounces of spirits of turpentine, and one ounce of alcohol, mix well, and apply it as you would any other liquid. It will remove all the grease.

**To Remove Stains from Linen.** Rub the stains with the salt of lemons. Many times the linen may be soaked in sour buttermilk, and then drying it in the sun, repeat this three or four times.

**To Remove Stains from Wood.** Mix together fuller's earth and water, and rub it into the boards. Let it dry and then scour it off with some clean water, and sand, or use lees to scour it with. It should be put on hot, and may easily be done by heating the lees.

**To Remove Tea Stains.** Mix thoroughly soft soap and salt—say a tablespoonful of salt to a teacupful of soap, rub on the spots, and spread the cloth on the grass where the sun will shine on it. Let it lie two or three days, then wash. If the spots are wet occasionally while lying on the grass, it will hasten the bleaching.

**To Remove Stains from Muslin.** If you have stained your muslin or gingham dress or your white pants with berries, before wetting with anything else, pour boiling water through the stains and they will disappear. Before fruit juice dries it can often be removed by cold water, using a sponge and towel if necessary.

**To Remove Acid Stains.** Stains caused by acids may be removed by tying some pearlsh up in the stained part; scrape some soap in cold, soft water, and boil the linen until the stain is gone.

## USEFUL RECIPES, ETC.

**To Disinfect Sinks and Drains.** Copperas dissolved in water, one-fourth of a pound to a gallon, and poured into a sink and water drain occasionally, will keep such places sweet and wholesome. A little chloride of lime, say half a pound to a gallon of water, will have the same effect, and either of these costs but a trifle.

A preparation may be made at home which will answer about as well as the chloride of lime. Dissolve a bushel of salt in a barrel of water, and with the salt water slack a barrel of lime, which should be made wet enough to form a thin paste or wash.

**To Disinfect a Cellar.** A damp, musty cellar may be sweetened by sprinkling upon the floor pulverized copperas, chloride of lime, or even common lime. The most effective means I have ever used to disinfect decaying vegetable matter is chloride of lime in solution. One pound may be dissolved in two gallons of water. Plaster of Paris has also been found an excellent absorbent of noxious odors. If used one part with three parts of charcoal, it will be found still better.

**How to Thaw Out a Water Pipe.** Water pipes usually freeze up when exposed, for inside the walls, where they cannot be reached, they are or should be packed to prevent freezing. To thaw out a frozen pipe, bundle a newspaper into a torch, light it, and pass it along the pipe slowly. The ice will yield to this much quicker than to hot water or wrappings of hot cloths, as is the common practice.

**To Prevent Mold.** A small quantity of carbolic acid added to paste, mucilage, and ink, will prevent mold. An ounce of the acid to a gallon of whitewash will keep cellars and dairies from the disagreeable odor which often taints milk and meat kept in such places.

**Economical Fire Kindler.** One may be made by dipping corn cobs in a mixture of melted resin and tar, and drying.

**Thawing Frozen Gas Pipe.** Mr. F. H. Shelton says: "I took off from over the pipe some four or five inches, just a crust of earth, and then put a couple of bushels of lime in the space, poured water over it, and slacked it, and then put canvas over that, and rocks on the canvas, so as to keep the wind from getting underneath. Next morning, on returning there, I found that the frost had been drawn out from the ground for nearly three feet. You can appreciate what an advantage that was, for picking through frozen ground, with the thermometer below zero, is no joke. Since then we have tried it several times. It is an excellent plan if you have time enough to let the lime work. In the daytime you cannot afford to waste the time, but if you have a spare night in which to work, it is worth while to try it."

**How to Test a Thermometer.** The common thermometer in a japanned iron case is usually inaccurate. To test the thermometer, bring water into the condition of active boiling, warm the thermometer gradually in the steam and then plunge it into the water. If it indicate a fixed temperature of two hundred and twelve degrees, the instrument is a good one.

**How to Keep Eggs Fresh.** The great secret in keeping eggs consists in entirely excluding the air from the interior. The lining next to the shell is, when in its natural stage, impervious to air, and the albumen is calculated to sustain it, but dampness and heat will cause decay, and, if the egg is allowed to lie in one position, especially upon one side, the yolk sinks through the albumen and settles upon the lining, and, not possessing proper qualities for preserving the skin in a healthy condition, it dries, and air penetrates and begins the work of destruction. Where eggs are set upon their small ends, the yolk is much less liable to reach the lining of the shell. Where eggs are packed in a barrel, keg or bucket, it is a good plan to turn the whole quantity onto a different side once in a while.

**Indelible Ink.** An indelible ink that cannot be erased, even with acids, can be obtained from the following recipe: To good gall ink add a strong solution of Prussian blue dissolved in distilled water. This will form a writing fluid which cannot be erased without destruction of the paper. The ink will write greenish blue, but afterward will turn black.



## USEFUL RECIPES, ETC.

**To Get a Broken Cork Out of a Bottle.** If in drawing a cork, it breaks, and the lower part falls down into the liquid, tie a long loop in a bit of twine, or small cord, and put it in, holding the bottle so as to bring the piece of cork near to the lower part of the neck. Catch it in the loop, so as to hold it stationary. You can then easily extract it with a corkscrew.

**A Wash for Cleaning Silver.** Mix together half an ounce of fine salt, half an ounce of powdered alum, and half an ounce of cream of tartar. Put them into a large white-ware pitcher, and pour on two quarts of water, and stir them frequently, till entirely dissolved. Then transfer the mixture to clean bottles, and cork them closely. Before using it, shake the bottles well. Pour some of the liquid into a bowl, and wash the silver all over with it, using an old, soft, fine linen cloth. Let it stand about ten minutes, and then rub it dry, with a buckskin. It will make the silver look like new.

**To Remove the Odor from a Vial.** The odor of its last contents may be removed from a vial by filling it with cold water, and letting it stand in any airy place uncorked for three days, changing the water every day.

**To Loosen a Glass Stopper.** The manner in which apothecaries loosen glass stoppers when there is difficulty in getting them out, is to press the thumb of the right hand very hard against the lower part of the stopper, and then give the stopper a twist the other way, with the thumb and forefinger of the left hand, keeping the bottle stiff in a steady position.

**To Make Shoes or Boots Water-Proof.** Melt together, in a pipkin, equal quantities of beeswax and mutton suet. While liquid rub it over the leather, including the soles.

**To Soften Boots and Shoes.** Kerosene will soften boots and shoes which have been hardened by water, and render them as pliable as new.

**To Remove Stains, Spots, and Mildew from Furniture.** Take half a pint of ninety-eight per cent. alcohol, a quarter of an ounce each of pulverized resin and gum shellac, add half a pint of linseed oil, shake well and apply with a brush or sponge. Sweet oil will remove finger marks from varnished furniture and kerosene from oiled furniture.

**To Freshen Gilt Frames.** Gilt frames may be revived by carefully dusting them, and then washing with one ounce of soda beaten up with the whites of three eggs. Scraped patches should be touched up with gold paint. Castile soap and water, with proper care, may be used to clean oil paintings. Other methods should not be employed without some skill.

**To Fill Cracks in Plaster.** Use vinegar instead of water to mix your plaster of Paris. The resultant mass will be like putty, and will not "set" for twenty or thirty minutes, whereas if you use water the plaster will become hard almost immediately, before you have time to use it. Push it into the cracks and smooth it off nicely with a tableknife.

**To Toughen Lamp Chimneys and Glassware.** Immerse the article in a pot filled with cold water, to which some common salt has been added. Boil the water well then cool slowly. Glass treated in this way will resist any sudden change of temperature.

**To Remove Paint from Window-Glass.** Rub it well with hot, sharp vinegar.

**To Clean Stovepipe.** A piece of zinc put on the live coals in the stove will clean out the stovepipe.

**To Brighten Carpets.** Carpets after the dust has been beaten out may be brightened by scattering upon them cornmeal mixed with salt and then sweeping it off. Mix salt and meal in equal proportions. Carpets should be thoroughly beaten on the wrong side first and then on the right side, after which spots may be removed by the use of ox-gall or ammonia and water.

**Kerosene Stains in Carpets** may be removed by sprinkling buckwheat flour over the spot. If one sprinkling is not enough, repeat.

## USEFUL RECIPES, ETC.

**To Keep Flowers Fresh** exclude them from the air. To do this wet them thoroughly, put in a damp box, and cover with wet raw cotton or wet newspaper, then place in a cool spot. To preserve bouquets, put a little saltpetre in the water you use for your bouquets, and the flowers will live for a fortnight.

**To Preserve Brooms.** Dip them for a minute or two in a kettle of boiling suds once a week and they will last much longer, making them tough and pliable. A carpet wears much longer swept with a broom cared for in this manner.

**To Clean Brassware.** Mix one ounce of oxalic acid, six ounces of rotten stone, all in powder, one ounce of sweet oil, and sufficient water to make a paste. Apply a small proportion, and rub dry with a flannel or leather. The liquid dip most generally used consists of nitric and sulphuric acids, but this is more corrosive.

**Polish or Enamel for Shirt Bosoms** is made by melting together one ounce of white wax and two ounces of spermaceti; heat gently and turn into a very shallow pan; when cold cut or break in pieces. When making boiled starch the usual way, enough for a dozen bosoms, add to it a piece of the polish the size of a hazel nut.

**To Keep Out Mosquitoes.** If a bottle of the oil of pennyroyal is left uncorked in a room at night, not a mosquito, nor any other blood-sucker, will be found there in the morning.

**Destruction of Rats.** The following recipe for the destruction originated with Dr. Ure, and is highly recommended as the best known means of getting rid of these most obnoxious and destructive vermin. Melt hog's lard in a bottle plunged in water, heated to about 150 degrees of Fahrenheit, introduce into it half an ounce of phosphorus for every pound of lard, then add a pint of proof spirit, or whisky, cork the bottle firmly after its contents have been heated to 150 degrees, taking it at the same time out of the water, and agitate smartly until the phosphorus becomes uniformly diffused, forming a milky-looking liquid. This liquid, being cooled, will afford a white compound of phosphorus and lard, from which the spirit spontaneously separates, and may be poured off to be used again for the same purpose, but not for drinking, for none of it enters into the combination, but it merely serves to comminute the phosphorus, and diffuse it in very small particles through the lard. This compound, on being warmed very gently, may be poured out into a mixture of wheat flour and sugar, incorporated therewith, and then flavored with oil of rhodium, or not, at pleasure. The flavor may be varied with oil of aniseed, etc. This dough, being made into pellets, is to be laid into rat holes. By its luminousness in the dark, it attracts their notice, and, being agreeable to their palates and noses, it is readily eaten, and proves certainly fatal.

**To Kill Cockroaches.** A teacupful of well bruised plaster of Paris, mixed with double the quantity of oatmeal, to which a little sugar may be added, although this last named ingredient is not essential. Strew it on the floor, or into the chinks where they frequent.

**Earwigs** are very destructive insects, their favorite food being the petals of roses, pinks, dahlias, and other flowers. They may be caught by driving stakes into the ground, and placing on each an inverted flower pot, for the earwigs will climb up and take refuge under the pot, when they may be taken out and killed. Clean bowls of tobacco pipes, placed in like manner on the tops of smaller sticks, are very good traps, or very deep holes may be made in the ground with a crowbar, into which they will fall, and may be destroyed by boiling water.

**To Destroy Ants.** Drop some quicklime on the mouth of their nest, and wash it in with boiling water, or dissolve some camphor in spirits of wine, then mix with water, and pour into their haunts, or tobacco water, which has been found effectual. They are averse to strong scents. Camphor, or a sponge saturated with creosote, will prevent their infesting a cupboard. To prevent their climbing up trees, place a ring of tar about the trunk, or a circle of rag moistened occasionally with creosote.

## USEFUL RECIPES, ETC.

**To Prevent Moths.** In the month of April or May, beat your fur garments well with a small cane or elastic stick, then wrap them up in linen, without pressing them too hard, and put betwixt the folds some camphor in small lumps; then put your furs in this state in boxes well closed. When the furs are wanted for use, beat them well as before, and expose them for twenty four hours to the air, which will take away the smell of the camphor. If the fur has long hair, as bear or fox, add to the camphor an equal quantity of black pepper in powder.

**To Get Rid of Moths.** 1. Procure shavings of cedar wood, and inclose in muslin bags, which can be distributed freely among the clothes.

2. Procure shavings of camphor wood, and inclose in bags.

3. Sprinkle pimento (allspice) berries among the clothes.

4. Sprinkle the clothes with the seeds of the musk plant.

5. To destroy the eggs, when deposited in woolen cloths, etc., use a solution of acetate of potash in spirits of rosemary, fifteen grains to the pint.

**Bed Bugs.** Spirits of naphtha rubbed with a small painter's brush into every part of the bedstead is a certain way of getting rid of bugs. The mattress and binding of the bed should be examined, and the same process attended to, as they generally harbor more in these parts than in the bedstead. Ten cents' worth of naphtha is sufficient for one bed.

**Bug Poison.** Proof spirit, one pint; camphor, two ounces; oil of turpentine, four ounces; corrosive sublimate, one ounce. Mix. A correspondent says, "I have been for a long time troubled with bugs, and never could get rid of them by any clean and expeditious method, until a friend told me to suspend a small bag of camphor to the bed, just in the center, overhead. I did so, and the enemy was most effectually repulsed, and has not made his appearance since—not even for a reconnoissance!" This is a simple method of getting rid of these pests, and is worth a trial to see if it be effectual in other cases.

**Mixture for Destroying Flies.** Infusion of quassia, one pint; brown sugar, four ounces; ground pepper, two ounces. To be well mixed together, and put in small, shallow dishes when required.

**To Destroy Flies in a room,** take half a teaspoonful of black pepper in powder, one teaspoonful of brown sugar, and one tablespoonful of cream, mix them well together, and place them in the room on a plate, where the flies are troublesome, and they will soon disappear.

**How to Destroy Insects.** The Bureau of Entomology, Department of Agriculture, Washington, sends out the following, for use as insecticides on or about plants, etc.: London purple—To twenty pounds flour from one-quarter to one-half pound is added and well mixed. This is applied with a sifter or blower. With forty gallons of water one-quarter to one-half pound is mixed for spraying. Paris Green—With twenty pounds of flour from three-quarters to one pound is mixed and applied by sifting or by a blower. The same amount of the insecticide to forty gallons of water is used as a spray. Bisulphate of Carbon—For use in the ground a quantity is poured or injected among the roots that are being infected. Against insects damaging stored grain of museum material a small quantity is used in an air-tight vessel. Carbolic Acid—A solution of one part in 100 of water is used against parasites on domestic animals and their barns and sheds; also on the surface of plants and among the roots in the ground. Hellebore—The powder is sifted on alone or mixed one part to twenty of flour. With one gallon of water one-quarter pound is mixed for spraying. Kerosene-Milk Emulsion—To one part milk add two parts kerosene, and churn by force pump or other agitator. The butter-like emulsion is diluted ad libitum with water. An easier method is to simply mix one part kerosene with eight of milk. Scap Emulsion—In one gallon hot water one-half pound whale oil soap is dissolved. This, instead of milk, is mixed to an emulsion with kerosene in the same manner and proportion as above. Pyrethrum, Persian Insect Powder—Is blown or sifted on dry, also applied in water one gallon to a tablespoonful of the powder, well stirred and then sprayed. Tobacco Decoction—This is made as strong as possible as a wash or spray to kill insect pests on animals and plants.

# 300 FACTS ABOUT POULTRY.

## Characteristics of the Various Breeds Concisely Stated.

No.	Races.	Weight of Chick, one day old.	Daily Increase of the Weight of Chick during 20 days	Annual Laying.	Weight of Eggs.	Quantity of Food Daily.	Average Weight of Flesh at 6 months.	Average Weight of Bone.
		oz.	oz.	Eggs	oz.	oz.	lbs. oz.	oz. dr.
1	Crevecœur.....	1 9-16	5-16	122	2 3-4	7	4 10	7 15
2	Houdan.....	1 3-8	11-32	125	2 3-16	6 13-16	3 15	7 0 3/4
3	La Bresse, black...	1 7-16	1-4	160	2 13-16	6 13-16	3 8	5 4 1/2
4	La Bresse, gray.....	1 5-16	1-4	150	1 7-8	5 1-4	3 7	5 1 1/2
5	Barbezieux.....	1 10-16	5-16	140	2 7-16	6 10-16	4 11	8 7 1/2
6	La Fleche.....	1 1-2	7-32	140	2 7-16	6 13-16	3 6	6 5 1/2
7	Le Mans.....	1 10-16	5-16	111	2 1-4	6 14-16	4 5	7 12
8	Gournay.....	1 3-16	3-16	140	2 7-16	4 11-16	2 10	4 9
9	Courtes Pattes.....	1 1-4	3-16	150	2 3-16	6 10-16	3 10	5 7 1/2
10	Andalusian.....	1 5-16	1-4	165	2 7-16	6 12-16	3 1	5 13
11	Brahma.....	1 5-8	7-32	120	2 1-4	9 1-2	4 11	10 15
12	Campine, silver spangled.....	1 1-16	3-16	225	1 11-16	5 1-2	2 3	4 3 3/4
13	Cochin, cinnamon...	1 13-16	3-16	115	2 1-16	10 1-2	4 9	14 4 1/2
14	Game.....	1 5-16	7-32	100	2 7-16	5 1-4	3 10	4 6 1/2
15	Cosaque.....	1 3-16	1-4	120	2 3-16	4 1-4	2 15	4 15
16	Dominique.....	1 1-4	7-32	110	2 7-32	4 3-4	3 11	5 5 1/2
17	Dorking.....	1 7-16	11-32	130	1 15-16	6 13-16	5 4	7 6 1/2
18	Spanish.....	1 5-16	7-32	160	2 3-4	6 13-16	3 1	9 8 1/2
19	Hamburg, silver spangled.....	1 2-16	7-32	239	1 11 16	5 1-4	2 3 1/2	4 6 1/2
20	Dutch, black.....	1 1-16	2-16	98	2	5 1-2	2 3	4 9
21	Langshan.....	1 5-8	5-16	115	2 3-16	7	5 4	10 10 1/2
22	Leghorn, silver spangled.....	1 1-4	1-4	190	2 7-32	6	3 15	7 0 3/4
23	Polands, golden spangled.....	1 3-16	3-16	100	2 1-16	4	2 13	4 12
24	Scotch Grey.....	1 1-4	7-32	110	2 7-32	6 13-16	3 4 1/2	4 15
25	Bantam, silver spangled.....	9-16	.....	80	1 1-8	2 7-8	.....	.....
26	Game Bantam.....	7-16	.....	90	1 1-32	2 3-4	.....	.....
27	Nagasaki.....	1-2	.....	95	1 3-32	3 1-8	.....	.....
28	Silkie.....	3-4	.....	98	1 1-4	3 9-16	.....	.....



Below are given soil and climate best adapted for the various breeds, rate of development, quality of flesh, etc., etc. The numbers in first column of preceding table refer to further description and characteristics of same breeds in paragraphs following:

1. Grass soil, mild climate, fears fog, develops rapidly and fattens easily, does not set, flesh exquisite white and delicate.
2. Calcareous soil, any climate, very rapid development, incubation nil, flesh delicate.

## FACTS ABOUT POULTRY.

3. Grass, hardy in all climates, fattens quickly, good sitters, does not steal nest, flesh exquisite.
4. Any climate, fattens quickly, incubation nil, flesh very good.
5. Mild climate, dry soil, development slow, incubation good, flesh delicate.
6. Mild climate, dry soil, development slow, fattens easily, incubation nil, flesh very delicate.
7. Dry soil, any climate, rapid development, incubate rarely, delicate flesh.
8. Grass soil, any climate, pretty rapid development, incubate rarely, flesh good.
9. Dry soil, hardy in all climates, development middling, incubation good but late, good flesh.
10. Dry soil and warm climate, development middling, incubation nil, flesh delicate.
11. Hardy, dry soil, any climate, development slow, incubation excellent, good mothers, flesh fair.
12. Hardy race, any climate, require much space, development middling, incubation nil, flesh good.
13. Hardy in any climate, develop very slowly, incubation excellent, good mothers but heavy, flesh stringy.
14. Hardy in any climate, development rapid, incubation capital, good mothers, flesh excellent.
15. Very hardy race in any climate, development rapid, incubation nil, flesh delicate.
16. Hardy in any climate, development middling, incubation very good, excellent mothers, flesh good.
17. Grass soil and mild climate, develop very rapidly, incubate well, very good mothers, flesh very delicate and juicy.
18. Delicate race, sandy soil and warm climate, develop slowly, long time feathering, incubation rare, flesh delicate.
19. Any soil or climate, development middling, incubation very rare, flesh delicate.
20. Delicate breed, require grass soil, development middling, incubation nil, flesh pretty good.
21. Very hardy in any climate, develop rapidly, incubation good, most excellent mothers, flesh excellent.
22. Very hardy in any climate, develop rapidly, incubate very rarely, flesh indifferent.
23. Delicate race, fear damp, development not very rapid, incubation rare, flesh delicate.
24. Delicate race, grass soil, development middling, incubation nil, flesh good.
25. Very delicate breed, dry soil, development middling, incubation pretty good.
26. Delicate, dry soil, development middling, incubation good—must not be disturbed.
27. Sandy soil, development middling, incubation indifferent, flesh good.
28. Very hardy race in any climate, develop rapidly, excellent incubation, flesh very bad.

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THE "POOR MAN'S REGION," in the Pine Barrens of the Southern States, is a belt of country more than seventeen hundred miles long and often one hundred and seventy miles broad, stretching from Richmond, Va., along the Atlantic and Gulf coasts, to beyond the western line of Louisiana. The soil is sandy and the principal tree is the long-leaf pine. These forests, while affording a valuable article of lumber, also yield pitch, tar and turpentine.

THE first proposer of secession in the United States Congress was Josiah Quincy, of Massachusetts, in 1811, who said that, if Louisiana were admitted into the Union, "it will be the right of all and the duty of some [of the States] definitely to prepare for a separation—amicably if they can, violently if they must." Mr. Poindexter, of Mississippi, called him to order as did the Speaker of the House; but on appeal the Speaker's decision was reversed, and Mr. Quincy sustained by a vote of fifty-three yeas to fifty-six noes, on the point of order.

## DUCKS, GEESE AND TURKEYS.

BREEDS.	Live weight • in pounds.	Live weight of Hen	Age at maturity, mos.	Cost of raising to maturity.	Annual cost of keep'g	Av. val. of eggs laid per year.
Ducks, common.....	3	3	6	.75	1.00	90
Ducks, Aylesbury.....	7	6	18	1.00	1.00	80
Ducks, Cayuga.....	6	5½	15	.90	1.00	1.00
Ducks, Pekin.....	6	5½	18	1.10	1.00	75
Ducks, Rouen.....	7½	6½	24	1.10	1.00	80
Geese, common.....	8	7	12	1.25	1.50	20
Geese, African.....	20	18	21	1.75	2.00	30
Geese, Egyptian.....	7	6	12	1.00	1.50	40
Geese, Embden.....	18	15	30	1.75	2.00	20
Geese, Toulouse.....	22	20	36	2.00	2.00	40
Turkeys, common.....	12	10	12	1.20	1.50	50
Turkeys, black.....	15	12	18	1.75	1.75	50
Turkeys, bronze.....	24	15	36	2.00	2.00	50
Turkeys, buff.....	15	12	24	1.75	1.50	50
Turkeys, Narragansetts....	22	14	30	1.75	1.75	50

THE annual supply of eggs in the United States is estimated at over 500,000,000 dozen, and, at the low price of sixteen cents per dozen, represents a value of over \$80,000,000—double the value of the product of our silver mines.

### Fate of the Apostles.

The following brief history of the fate of the Apostles may be new to those whose reading has not been evangelical :

St. Matthew is supposed to have suffered martyrdom or was slain with the sword at the city of Ethiopia.

St. Mark was dragged through the streets of Alexandria, in Egypt, till he expired.

St. Luke was hanged upon an olive tree in Greece.

St. John was put into a caldron of boiling oil at Rome and escaped death. He afterward died a natural death at Ephesus in Asia.

St. James the Great was beheaded at Jerusalem.

St. James the Less was thrown from a pinnacle or wing of the temple and then beaten to death with a fuller's club.

St. Philip was hanged up against a pillar at Hieropolis, a city of Phrygia.

St. Bartholomew was flayed alive by the command of a barbarous king.

St. Andrew was bound to a cross, whence he preached unto the people till he expired.

St. Thomas was run through the body with a lance at Carmandel, in the East Indies.

St. Jude was shot to death with arrows.

St. Simon Zealot was crucified in Persia.

St. Matthias was first stoned and then beheaded.

St. Barnabas was stoned to death by Jews at Salania.

St. Paul was beheaded at Rome by the tyrant Nero.

## How to Tell the Age of a Horse.



The safest way of determining the age of a horse is by the appearance of the teeth, which undergo certain changes in the course of years.

Eight to fourteen days after birth, the first middle nippers of the set of milk teeth are cut (Fig. 1), four to six weeks afterwards the pair next to them (Fig. 2), and finally, after six or eight months, the last (Fig. 3).

All these milk teeth have a well defined body and neck, and a slender fang, and on their front surface grooves of furrows, which disappear from the middle nippers at the end of one year, from the next pair in two years, and from the incisive teeth (cutters) in three years.

At the age of two the nippers become loose and fall out, in their places appear two permanent teeth, with deep, black cavities, and full, sharp edges (Fig. 4).

At the age of three, the next pair (Fig. 5) fall out.

At four years old, the corner teeth fall out (Fig. 6).

At five years old, the horse has his permanent set of teeth.

The teeth grow in length as the horse advances in years, but at the same time his teeth are worn away by use about one-twelfth of an inch every year, so that the black cavities of the center nippers below disappear in the sixth year (Fig. 7), those of the next pair in the seventh year (Fig. 8), and those of the corner teeth in the eighth year (Fig. 9). Also the outer corner teeth of upper and lower jaw just meet at eight years of age.

At nine years old, cups leave the two center nippers above, and each of the two upper corner teeth has a little sharp protrusion at the extreme outer corner (Fig. 10).

At the age of ten, the cups disappear from the adjoining teeth.

At the age of eleven, the cups disappear from the corner teeth above, and are only indicated by brownish spots.

The oval form becomes broader, and changes, from the twelfth to the sixteenth year, more and more into a triangular form, and the teeth lose, finally, with the twentieth year, all regularity. There is nothing remaining in the teeth that can afterwards clearly show the age of the horse, or justify the most experienced examiner in giving a positive opinion.

The tusks, or canine teeth, conical in shape, with a sharp point, and curved, are cut between the third and fourth year, their points become more and more rounded until the ninth year, and after that, more and more dull in the course of years, and lose, finally, all regular shape. Mares have, frequently, no tusks, or only very faintly indicated.

**Age of Sheep and Goats.** At one year old they have eight front teeth of uniform size. At two years the two middle ones are supplanted by two large ones. At three a small tooth appears on each side. At four there are six large teeth. At five all the front teeth are large, and at six all begin to get worn.

**Age of Cattle.** A cow's horn is supposed to furnish a correct indication of the age of the animal, but this is not always true. For ordinary purposes, however, the following will be found approximately correct: At two years of age a circle of thicker matter begins to form on the animal's horns, which becomes clearly defined at three years of age, when another circle begins to form, and an additional circle every year thereafter. The cow's age then can be determined by adding two to the number of circles. The rings on a bull's horns do not show themselves until he is five years old—so in the case of a bull five must be added to the number of rings. Unless the rings are clear and distinct these rules will not apply. Besides, dishonest dealers sometimes file off some of the rings of old cattle.

# MEDICINES FOR THE HORSE.

NAME OF DRUG.	ACTION AND USE.	DOSE.	ANTIDOTE.
Aloes	Laxative and Tonic	½ to 1 oz	
Alum	Astringent	2 to 3 drs	
Anise Seed	Aromatic and Stomachic	½ to 2 oz	
Aqua Ammonia	Stimulant and Antacid	1 to 4 drs	Vinegar
Arsenic	{ Alterative and Tonic For Paralysis, Mange, etc }	1 to 5 grs	Magnesia and oil
Asafetida	Anti-spasmodic, Coughs, etc	1 to 3 drs	
Bicarbonate of Potash	{ Diuretic and Antacid. For Rheumatism }	3 to 5 drs	{ Vinegar and raw Linseed Oil }
Bismuth	For Chronic Diarrhœa, etc	½ to 1 oz	
Black Antimony	Promotes the Secretions	¼ to ½ dr	{ Infusion of oak bark. G ve also Linseed Oil }
Blue Vitriol	Astringent and Tonic	½ to 1 dr	Eggs, Milk, etc
Calomel	Cathartic	10 to 40 grs	Eggs and Milk
Camphor	Anti-spasmodic	½ to 1 dr	
Cantharides	Diuretic and Stimulant	3 to 6 grs	
Carbolic Acid	Externally and Disinfectant		Eggs, soap, gruel
Castor Oil	Cathartic	½ to 1 pt	
Cayenne	Stimulant and Carminative	5 to 25 grs	
Chlorate of Potash	Diuretic. For Bloating, etc	½ to 2 drs	
Copperas	Tonic and Astringent	½ to 1½ drs	
Croton Oil	Powerful Purgative	10 to 15 d'ps	Opium
Digitalis Leaf	Sedative and Diuretic	10 to 20 grs	Stimulate
Epsom Salts	Cathartic and Febrifuge	2 to 8 oz	
Ether	Anti-spasmodic	½ to 2 oz	
Fowler's Solution	Used for Skin Diseases	1 to 4 drs	{ Hydrated Perox- ide of Iron }
Gentian Root	Tonic	1 to 2 drs	
Ginger	{ Tonic, Stimulant & Stom- achic. For Flatulent Col- ic, Dyspepsia, etc }	2 to 5 drs	
Glauber's Salts	Cathartic	6 to 12 ozs	
Iodide of Potas- sium	{ Diuretic and Alterative. For Rheumatism, Dropsy, Enlarged Glands, etc }	½ to 1½ drs	{ Give freely starch or flour, with water largely }
Linseed Oil, Raw	Cathartic and Nutritive	1 to 2 pts	
Magnesia	{ For colts as an Antacid and Laxative }	¼ to 1 oz	
Mercurial Ointm't	{ For Mange, Itch, Lice, and other Parasites }		{ Whites of eggs with milk, freely Salaratus, follow- ed quickly by copperas, dissolv- ed in water }
Nux Vomica	{ Nervous Stimulant. For Paralysis }	15 to 25 grs	{ Belladonna, str'g coffee, brandy & ammonia. Dash cold water on and keep horse movi'g }
Opium	{ Anodyne and Anti-spas- modic. Given in Colic, Inflammation of Bowels, Diarrhœa, etc }	¼ to 1 dr	
Prepared Chalk	Antacid	½ to 1 oz	
Quinine	Tonic. During Convalescence	15 to 50 grs	
Saltpetre	Diuretic and Febrifuge	1 to 3 drs	
Soda Bicarb,	Similar to Bicarb Potash	3 to 8 drs	
Soda Sulphite	{ Antiseptic and Alterative. For Blood Diseases }	½ to 1 oz	{ Linseed oil large- ly, raw }
Solution of Lime	{ Antacid, an antidote to poisoning by acids }	4 to 6 ozs	
Sp'ts of Chloroform	Anodyne & Anti-spasmodic	1 to 2 ozs	



## MEDICINES FOR THE HORSE.—Continued.

NAME OF DRUG.	ACTION AND USE.	DOSE.	ANTIDOTE.
Strychnia	{ Tonic & Stimulant. For Paralysis }	½ to 1 gr	Tobacco
Sulphur	{ Alterative and Laxative. Skin diseases, Rheu'tism }	½ to 2 oz	
Sweet Sp'ts Nitre	Diuretic and Diaphoretic.	½ to 1½ oz	Tannic Acid { Small doses of Nux Vomica, stim- ulants largely, & keep moving }
Tannic Acid	Astringent	20 to 40 grs	
Tartar Emetic	Sedative and Alterative	¼ to ½ dr	
Tin. Aconite Root	Sedative. For Lung Fever, etc	15 to 35 d'ps	
Tin. Cantharides	Stimulant and Tonic	1 to 2 drs	See NUX VOMICA
Tincture Ergot	Parturient	1 to 2 oz	
Tincture Iodine	Used externally		
Tincture Iron	{ Tonic and Astringent. For Typhoid Diseases }	½ to 1 oz	
Tr. Nux Vomica	{ Tonic. Stimulant in Par- alysis and Dyspepsia }	2 to 4 drs	See OPIUM
Tincture Opium	Anodyne and Anti-spasmodic	1 to 2 ozs	
White Vitriol	{ Astringent. For Wounds Cuts & Sores, in solution }	5 to 15 grs	

For a colt one month old, give one twenty-fourth of the full dose for an adult horse as given above; three months old, one-twelfth; six months old, one-sixth; one year old, one-third; two years old, one-half; three years old, three-fourths.

### The Seven Bibles of the World

Are the Koran of the Mohammedans, the Eddas of the Scandinavians, the Try Pitikes of the Buddhists, the Five Kings of the Chinese, the Three Vedas of the Hindoos, the Zendavesta, and the Scriptures of the Christians. The Koran is the most recent of these seven Bibles, and not older than the seventh century of our era. It is a compound of quotations from the Old and New Testaments, the Talmud, and the Gospel of St. Barnabas. The Eddas of the Scandinavians were first published in the fourteenth century. The Pitikes of the Buddhists contain sublime morals and pure aspirations, and their author lived and died in the sixth century before Christ. There is nothing of excellence in these sacred books not found in the Bible. The sacred writings of the Chinese are called the Five Kings, king meaning web of cloth, or the warp that keeps the threads in their place. They contain the best sayings of the best sages on the ethico-political duties of life. These sayings cannot be traced to a period higher than the eleventh century B.C. The Three Vedas are the most ancient books of the Hindoos, and it is the opinion of Max Muller, Wilson, Johnson, and Whitney that they are not older than eleven centuries B.C. The Zendavesta of the Persians is the grandest of all the sacred books next to our Bible. Zoroaster, whose sayings it contains, was born in the twelfth century B.C. Moses lived and wrote his Pentateuch fifteen centuries B.C., and, therefore, has a clear margin of 300 years older than the most ancient of the sacred writings.

## CANARY BIRDS.

### HOW TO KEEP THEM HEALTHY AND IN GOOD SONG.

Place the cage so that no draught of air can strike the bird.

Give nothing to healthy birds but rape, hemp, canary seed, water, cuttle-fish bone, and gravel paper or sand on floor of cage.

A bath three times a week.

The room should not be overheated.

When moulting keep warm and avoid all draughts of air.

Give plenty of German summer rape seed. A little hard boiled egg mixed with cracker, grated fine, once or twice a week, is excellent.

Feed at a certain hour in the morning.

### DISEASES AND CURES.

*Husk or Asthma.* The curatives are aperients, such as en-dive, water cresses, bread and milk and red pepper.

*Pip.* Mix red pepper, butter and garlic and swab out the throat.

*Sweating.* Wash the hen in salt and water, and dry rapidly.

*Costiveness.* Plenty of green food and fruit.

*Obstruction of the Rump Gland.* Pierce with a needle. Press the inflamed matter out, and drop fine sugar over the wound.

*Lice.* Keep a saucer of fresh water in the cage and the bird will free itself.

*Overgrown Claws or Beak.* Pare carefully with a sharp knife.

*Moulting.* Give plenty of good food and keep warm. Saffron and a rusty nail put in their drinking water is excellent.

*Loss of Voice.* Feed with paste of bread, lettuce and rape seed with yoke of egg. Whisky and sugar is an excellent remedy.

### What a Horse Can Draw.

On metal rails a horse can draw:

One and two-thirds times as much as on asphalt pavement.

Three and one-third times as much as on good Belgian blocks.

Five times as much as on ordinary Belgian blocks.

Seven times as much as on good cobble-stone.

Thirteen times as much as on ordinary cobble-stone.

Twenty times as much as on an earth road.

Forty times as much as on sand.

A modern compilation of engineering maxims states that a horse can drag, as compared with what he can carry on his back, in the following proportions: On the worst earthen road, three times more; on a good macadamized road, nine; on plank, twenty-five; on a stone trackway, thirty-three; and on a good railway, fifty-four times as much.

### Value of Foreign Money.

Pound sterling of England, \$4.84; guinea, \$5.05; crown, \$1.21; shilling, 24 cents; Napoleon of France, \$3.84; five-franc, 96 cents; franc, 18½ cents; thaler of Saxony, 68 cents; guilder of Netherlands, 40 cents; ducat of Austria, \$2.28; florin of Austria, 48½ cents; doubloon of Spain (1800), \$15.54; real of Spain, 5 cents; five roubles of Russia, \$3.95; rouble, 75 cents; franc of Belgium, 18½ cents; ducat of Bavaria, \$2.27; franc of Switzerland, 18½ cents; crown of Tuscany, \$1.05½.

# WEIGHTS AND MEASURES.

**TROY WEIGHT**—24 grains make 1 pennyweight, 20 pennyweights make 1 ounce. By this weight, gold, silver and jewels only are weighed. The ounce and pound in this are same as in Apothecaries' weight.

**APOTHECARIES' WEIGHT**—20 grains make one scruple, 3 scruples make 1 dram, 8 drams make 1 ounce, 12 ounces make 1 pound.

**AVOIRDUPOIS WEIGHT**—6 drams make 1 ounce, 16 ounces make one pound, 25 pounds make 1 quarter, 4 quarters make 1 hundredweight, 2,000 pounds make 1 ton.

**DRY MEASURE**—2 pints make 1 quart, 8 quarts make 1 peck, 4 pecks make 1 bushel, 36 bushels make 1 chaldron.

**LIQUID OR WINE MEASURE**—4 gills make 1 pint, 2 pints make 1 quart, 4 quarts make 1 gallon,  $3\frac{1}{2}$  gallons make 1 barrel, 2 barrels make 1 hogshead.

**TIME MEASURE**—60 seconds make 1 minute, 60 minutes make 1 hour, 24 hours make 1 day, 7 days make 1 week, 4 weeks make 1 lunar month, 28, 29, 30 or 31 days make 1 calendar month (30 days make 1 month in computing interest), 52 weeks and 1 day, or 12 calendar months, make 1 year; 365 days, 5 hours, 48 minutes and 49 seconds make 1 solar year.

**CIRCULAR MEASURE**—60 seconds make 1 minute, 60 minutes make 1 degree, 30 degrees make 1 sign, 90 degrees make 1 quadrant, 4 quadrants or 360 degrees make 1 circle.

**LONG MEASURE—DISTANCE**—3 barleycorns 1 inch, 12 inches 1 foot, 3 feet 1 yard,  $5\frac{1}{2}$  yards 1 rod, 40 rods 1 furlong, 8 furlongs 1 mile.

**CLOTH MEASURE**— $2\frac{1}{4}$  inches 1 nail, 4 nails 1 quarter, 4 quarters 1 yard.

**MISCELLANEOUS**—3 inches one palm, 4 inches 1 hand, 6 inches 1 span, 18 inches 1 cubit, 21.8 inches 1 Bible cubit,  $2\frac{1}{2}$  feet 1 military pace.

**SQUARE MEASURE**—144 square inches 1 square foot, 9 square feet 1 square yard,  $30\frac{1}{4}$  square yards 1 square rod, 40 square rods 1 rood, 4 roods 1 acre.

**SURVEYORS' MEASURE**—7.92 inches 1 link, 25 links 1 rod, 4 rods 1 chain, 10 square chains or 160 square rods 1 acre, 640 acres 1 square mile.

**CUBIC MEASURE**—1,728 cubic inches 1 cubic foot, 27 cubic feet 1 cubic yard, 128 cubic feet 1 cord (wood), 40 cubic feet 1 ton (shipping), 2,150.42 cubic inches 1 standard bushel, 268.8 cubic inches 1 standard gallon, 1 cubic foot four-fifths of a bushel.

**METRIC WEIGHTS**—10 milligrams 1 centigram, 10 centigrams 1 decigram, 10 decigrams 1 gram, 10 grams 1 dekagram, 10 dekagrams 1 hektogram, 10 hektograms 1 kilogram.

**METRIC MEASURES**—(One milliliter—Cubic centimeter.)—10 milliliters 1 centiliter, 10 centiliters 1 deciliter, 10 deciliters 1 liter, 10 liters 1 dekaliter, 10 dekaliters 1 hektoliter, 10 hektoliters 1 kiloliter.

**METRIC LENGTHS**—10 millimeters 1 centimeter, 10 centimeters 1 decimeter, 10 decimeters 1 meter, 10 meters 1 dekameter, 10 dekameters 1 hektometer, 10 hektometers 1 kilometer.

## Relative Value of Apothecaries' and Imperial Measure.

Apothecaries.		Imperial.
1 gallon equals.....	6 pints,	13 ounces, 2 drams, 23 minims.
1 pint ".....	16 "	5 " 18 "
1 fluid ounce equals.....	1 "	0 " 20 "
1 fluid dram ".....		1 " $2\frac{1}{2}$ "

## Handy Metric Tables.

The following tables give the equivalents of both the metric and common systems, and will be found convenient for reference:

	APPROXIMATE EQUIVALENT.	ACCURATE EQUIVALENT.
1 inch .....	[length].... 2½ cubic centimeters.....	2.539
1 centimeter.....	0.4 inch.....	0.393
1 yard .....	1 meter .....	0.914
1 meter (39.37 inches).....	1 yard.....	1.093
1 foot.....	30 centimeters.....	30.479
1 kilometer (1,000 meters).....	½ mile.....	0.621
1 mile .....	1½ kilometers.....	1.600
1 gramme .....	[weight].... 15½ grains.....	15.432
1 grain.....	0.064 gramme .....	0.064
1 kilogramme (1,000 grammes).....	2.2 pounds avoirdupois.....	2.204
1 pound avoirdupois.....	½ kilogramme .....	0.453
1 ounce avoirdupois (437½ grains).....	28½ grammes.....	28.349
1 ounce troy, or apothecary (480 grains).....	31 grammes.....	31.103
1 cubic centimeter .....	[bulk].... 1.06 cubic inch.....	0.060
1 cubic inch.....	16½ cubic centimeters.....	16.386
1 liter (1,000 cubic centimeters).....	1 United States standard quart.....	0.946
1 United States quart.....	1 liter.....	1.057
1 fluid ounce.....	29½ cubic centimeters.....	29.570
1 hectare (10,000 square meters) [surface].....	2½ acres.....	2.471
1 acre.....	0.4 hectare.....	0.40

It may not be generally known that we have in the nickel five-cent piece of our coinage a key to the tables of linear measures and weights. The diameter of this coin is two centimeters, and its weight is five grammes. Five of them placed in a row will, of course, give the length of the decimeter; and two of them will weigh a decagram. As the kiloliter is a cubic meter, the key to the measure of length is also the key to the measures of capacity. Any person, therefore, who is fortunate enough to own a five-cent nickel, may carry in his pocket the entire metric system of weights and measures.

## Handy Weights and Measures.

One quart of wheat flour is one pound. One quart of corn meal weighs eighteen ounces. One quart of butter, soft, weighs fourteen to sixteen ounces. One quart of brown sugar weighs from a pound to a pound and a quarter, according to dampness. One quart of white sugar weighs one pound. Ten medium-sized eggs weigh one pound. A tablespoonful of salt is one ounce. Eight tablespoonfuls make a gill. Two gills or sixteen tablespoonfuls, are half a pint. Sixty drops are one teaspoonful. Four tablespoonfuls are one wineglassful. Twelve tablespoonfuls are one teacupful. Sixteen tablespoonfuls, or half a pint, are one tumblerful.

**THE MEANING OF MEASURES**—A square mile is equal to 640 acres. A square acre is 208.71 feet on one side. An acre is 43,560 square feet. A league, 3 miles. A span, 10½ inches. A hand, 4 inches. A palm, 3 inches. A great cubit, 11 inches. A fathom, 6 feet. A mile, 5,280 feet.

**DOMESTIC AND DROP MEASURES APPROXIMATED**—A teaspoonful, one fluid dram 4 grams; a dessertspoonful, two fluid drams 3 grams; a tablespoonful, half fluid ounce 16 grams; a wineglassful, two fluid ounces 64 grams; a tumblerful, half pint 256 grams.

The original Mrs. Partington was a respectable old lady who lived at Sidmouth, in Devonshire, England. Her cottage was on the beach, and during a terrific storm (November, 1824) the sea rose to such a height as every now and then to invade the old lady's residence. The old lady persistently mopped out the water with such help as she could command, until finally she was compelled to retreat to an upper story.

# PRACTICAL CALCULATIONS.

## Short Cuts in Arithmetic—Handy Tables for Ready Reckoning.

**TO ASCERTAIN THE WEIGHT OF CATTLE**—Measure the girt close behind the shoulder, and the length from the fore part of the shoulder-blade along the back to the bone at the tail, which is in a vertical line with the buttock, both in feet. Multiply the square of the girt, expressed in feet, by ten times the length, and divide the product by three; the quotient is the weight, nearly, of the fore quarters, in pounds avoirdupois. It is to be observed, however, that in very fat cattle the fore quarters will be about one-twentieth more, while in those in a very lean state they will be one-twentieth less than the weight obtained by the rule.

**RULES FOR MEASURING CORN IN CRIB, VEGETABLES, ETC., AND HAY IN MOW**—This rule will apply to a crib of any size or kind. Two cubic feet of good, sound, dry corn in the ear will make a bushel of shelled corn. To get, then, the quantity of shelled corn in a crib of corn in the ear, measure the length, breadth and height of the crib, inside the rail; multiply the length by the breadth and the product by the height, then divide the product by two, and you have the number of bushels of shelled corn in the crib.

To find the number of bushels of apples, potatoes, etc., in a bin, multiply the length, breadth and thickness together, and this product by eight, and point off one figure in the product for decimals.

To find the amount of hay in a mow, allow 512 cubic feet for a ton, and it will come out very generally correct.

**TO MEASURE BULK WOOD**—To measure a pile of wood, multiply the length by the width, and that product by the height, which will give the number of cubic feet. Divide that product by 128, and the quotient will be the number of cords. A standard cord of wood, it must be remembered, is four feet thick; that is, the wood must be four feet long. Farmers usually go by surface measure, calling a pile of stove wood eight feet long and four feet high a cord. Under such circumstances thirty-two feet would be the divisor.

**HOW TO MEASURE A TREE**—Very many persons, when looking for a stick of timber, are at a loss to estimate either the height of the tree or the length of timber it will cut. The following rule will enable any one to approximate nearly to the length from the ground to any position desired on the tree: Take a stake, say six feet in length, and place it against the tree you wish to measure. Then step back some rods, twenty or more if you can, from which to do the measuring. At this point a light pole and a measuring rule are required. The pole is raised between the eyes and the tree, and the rule is brought into position against the pole. Then by sighting and observing what length of the rule is required to cover the stake at the tree, and what the entire tree, dividing the latter length by the former and multiplying by the number of feet the stake is long, you reach the approximate height of the tree. For example, if the stake at the tree be six feet above ground and one inch on your rule corresponds exactly with this, and if then the entire height of the tree corresponds exactly with say nine inches on the rule, this would show the tree to possess a full height of fifty-four feet. In practice it will thus be found an easy matter to learn the approximate height of any tree, building, or other such object.

**TO MEASURE CASKS OR BARRELS**—Find mean diameter by adding to head diameter two-thirds (if staves are but slightly curved, three-fifths) of difference between head and bung diameters, and dividing by two. Multiply square of mean diameter in inches by .7854, and the product by the height of the cask in inches. The result will be the number of cubic inches. Divide by 231 for standard or wine gallons, and by 282 for beer gallons.

**GRAIN MEASURE**—To find the capacity of a bin or wagon-bed, multiply the cubic feet by .8 (tenths). For great accuracy, add  $\frac{1}{3}$  of a bushel for every 100 cubic feet. To find the cubic feet, multiply the length, width and depth together.

**CISTERN MEASURE**—To find the capacity of a round cistern or tank, multiply the square of the average diameter by the depth, and take  $3.16$  of

## PRACTICAL CALCULATIONS.

the product. For great accuracy, multiply by .1865. For square cisterns or tanks, multiply the cubic feet by .28. The result is the contents in barrels.

**LAND MEASURE**—To find the number of acres in a body of land, multiply the length by the width (in rods), and divide the product by 160. When the opposite sides are unequal, add them, and take half the sum for the mean length or width.

**MEASURES OF CAPACITY**—The following table, showing contents of boxes, will often be found convenient, taking inside dimensions :

- 24 in. x 24 in. x 14.7 will contain a barrel of  $31\frac{1}{2}$  gallons.
- 15 in. x 14 in. x 11 in. will contain 10 gallons.
- $8\frac{1}{4}$  in. x 7 in. x 4 in. will contain a gallon.
- 4 in. x 4 in. x 3.6 in. will contain a quart.
- 24 in. x 28 in. x 16 in. will contain 5 bushels.
- 16 in. x 12 in. x 11.2 in. will contain a bushel.
- 12 in. x 11.2 in. x 8 in. will contain a half bushel.
- 7 in. x 6.4 in. x 12 in. will contain a peck.
- 8.4 in. x 8 in. x 4 in. will contain a half peck, or 4 dry quarts.
- 6 in. x 5.3-5 in., and 4 in. deep, will contain a half gallon.
- 4 in. x 4 in., and 2 1-10 in. deep, will contain a pint.

### Food for Stock.

One hundred pounds of good hay for stock are equal to: Beets, white silesia, 669; turnips, 469; rye straw, 429; clover, red, green, 373; carrots, 371; mangolds, 368½; potatoes, kept in pit, 350; oat straw, 317; potatoes, 360; carrot leaves (tops), 135; hay, English, 100; Lucerne, 89; clover, red, dry, 88; buckwheat, 78½; corn, 62½; oats, 59; barley, 58; rye, 53½; wheat, 44½; oil-cake, linseed, 43; peas, dry, 37½; beans, 28.

### Number of Shrubs, Plants or Trees in an Acre.

Distances apart.	No. of Plants.	Distances apart.	No. of Plants.	Distances apart.	No. of Plants.
1 by 1	43,560	5 by 2	4,356	15 by 15	193
$1\frac{1}{2}$ " $1\frac{1}{2}$	19,360	5 " 3	2,904	16 " 16	170
2 " 1	21,780	5 " 4	2,178	17 " 17	150
2 " 2	10,890	5 " 5	1,742	18 " 18	134
$2\frac{1}{2}$ " $2\frac{1}{2}$	6,069	$5\frac{1}{2}$ " $5\frac{1}{2}$	1,417	19 " 19	120
3 " 1	14,520	6 " 6	1,210	20 " 20	108
3 " 2	7,260	$6\frac{1}{2}$ " $6\frac{1}{2}$	1,031	24 " 24	75
3 " 3	4,840	7 " 7	888	25 " 25	69
$3\frac{1}{2}$ " $3\frac{1}{2}$	3,535	8 " 8	680	27 " 27	59
4 " 1	10,890	9 " 9	537	30 " 30	48
4 " 2	5,445	10 " 10	435	40 " 40	27
4 " 3	3,630	11 " 11	361	50 " 50	17
4 " 4	2,722	12 " 12	302	60 " 60	12
$4\frac{1}{2}$ " $4\frac{1}{2}$	2,151	13 " 13	257	66 " 66	10
5 " 1	8,712	14 " 14	222		

The city of Ghent, Belgium, stands on twenty-six islands, connected with each other by eighty bridges. The city of Venice is built on eighty islands, connected by nearly 400 bridges. In Venice canals serve for streets and gondolas for carriages.

Bricks and common pottery ware owe their red color to the iron naturally contained in the clay of which they are formed, the iron, by the action of the heat, being converted into red oxide of iron. Some varieties of clay, like that found near Milwaukee, contain little or no iron, and bricks made from such clay are consequently of a light yellow color.

## Quantity of Seeds Required for Planting.

	Seeds, per ounce.	Length of Drill, per oz.	Vitality. Years.
Asparagus.....	1,000 to 1,200	50 feet	4 to 6
Beet.....	1,200 to 1,500	100 "	6 " 8
Carrot.....	20,000 to 24,000	200 "	1 " 3
Cabbage.....	8 000 to 12,000	Transplant	4 " 6
Cauliflower.....			
Celery.....	50,000 to 60,000	Transplant	3 " 5
Egg plant.....	5,000 to 6,000	Transplant	5 " 6
Endive.....	20,000 to 24,000	Transplant	8 " 10
Lettuce.....	25 000 to 30,000	40 0 feet	5 " 6
Okra.....	500 to 600	50 "	5 " 6
Onion.....	7,000 to 8,000	200 "	1 " 2
Parsnip.....	5,000 to 6,000	200 "	1 " 2
Radish.....	3,000 to 4 000	100 "	4 " 5
Salsify.....	2,500 to 3 000	100 "	4 " 5
Spinach.....	2,000 to 3,000	100 "	4 " 5
Tomato.....	About 20,000	Transplant	4 " 5
Turnip.....	8,000 to 12,000	200 feet	6 " 7

## Number of Pounds to the Bushel, Legal Weight, in the Different States.

STATES.	Wheat.	Rye.	Oats.	Barley.	Buckwheat.	Shelled Corn	Corn on the Cob.	Corn Meal.	Potatoes.	Sweet Potatoes.	Onions.	Beans.	Peas.	Dried Apples.	Anthracite Coal.
Arkansas.....	60	56	32	48	52	50	70	50	60	50	57	60	46	24	80
California.....	65	54	32	50	40	52	70	50	60	55	57	60	60	24	80
Connecticut.....	60	56	32	48	48	56	70	50	60	55	57	60	60	24	80
Georgia.....	60	56	32	47	52	56	70	50	60	55	57	60	60	24	80
Illinois.....	60	56	32	48	52	56	70	50	60	55	57	60	60	24	80
Indiana.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
Iowa.....	60	56	32	48	52	56	70	50	60	55	57	60	60	24	80
Kansas.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
Kentucky.....	60	56	32	47	55	55	70	50	60	55	57	60	60	24	76
Maine.....	60	50	30	48	48	56	70	50	60	55	52	64	60	24	80
Massachusetts.....	60	56	32	48	48	56	70	50	60	56	52	60	60	22	80
Michigan.....	60	56	32	48	48	56	70	50	60	56	54	60	60	22	80
Minnesota.....	60	56	32	48	42	56	70	50	60	55	57	60	60	22	80
Missouri.....	60	56	32	48	52	56	70	50	60	55	57	60	60	24	80
New Hampshire.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
New Jersey.....	60	56	32	48	48	56	70	50	60	55	57	60	60	24	80
New York.....	60	56	32	48	48	56	70	50	60	55	57	60	60	24	80
North Carolina.....	60	56	32	48	50	54	70	50	60	55	57	60	60	24	80
Ohio.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
Pennsylvania.....	60	56	32	47	48	56	70	50	60	55	57	60	60	24	80
Rhode Island.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
South Carolina.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
Tennessee.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80
Vermont.....	60	56	32	48	46	52	70	50	60	55	57	60	60	24	80
Virginia.....	60	56	32	48	52	56	70	50	60	55	57	60	60	24	80
Wisconsin.....	60	56	32	48	50	56	70	50	60	55	57	60	60	24	80

ANTS never sleep. Emerson mentions this as "a recently observed fact."

## Barbed Wire Required for Fences.

Estimated number of pounds of barbed wire required to fence space or distances mentioned, with one, two or three lines of wire, based upon each pound of wire measuring one rod ( $16\frac{1}{2}$  feet).

	1 Line.	2 Lines.	3 Lines.
1 square acre .....	50 $\frac{2}{3}$ lbs.	101 $\frac{1}{3}$ lbs.	152 lbs.
1 side of a square acre .....	12 $\frac{2}{3}$ lbs.	25 $\frac{1}{3}$ lbs.	38 lbs.
1 square half-acre .....	36 lbs.	72 lbs.	108 lbs.
1 square mile .....	1280 lbs.	2560 lbs.	3840 lbs.
1 side of a square mile .....	320 lbs.	640 lbs.	960 lbs.
1 rod in length .....	1 lb.	2 lbs.	3 lbs.
100 rods in length .....	100 lbs.	200 lbs.	300 lbs.
100 feet in length .....	6 1-16 lbs.	12 $\frac{1}{8}$ lbs.	18 3-16 lbs.

**TO MEASURE CORN OR SIMILAR COMMODITY ON A FLOOR**—Pile up the commodity in the form of a cone; find the diameter in feet; multiply the square of the diameter by .7854, and the product by one-third the height of the cone in feet; from this last product deduct one-fifth of itself, or multiply it by .803564, and the result will be the number of bushels.

**CONTENTS OF FIELDS AND LOTS**—An acre is 43,560 square feet. The following table will assist farmers in making an accurate estimate of the amount of land in different fields under cultivation:

10 rods	×	16 rods	=	1 A.	100 ft.	×	108 $\frac{9}{10}$ ft.	=	$\frac{1}{4}$ A.
8 "	×	20 "	=	1 "	25 "	×	100 "	=	.0574 "
5 "	×	32 "	=	1 "	25 "	×	110 "	=	.0631 "
4 "	×	40 "	=	1 "	25 "	×	120 "	=	.0689 "
5 yards	×	968 "	=	1 "	25 "	×	125 "	=	.0717 "
10 "	×	484 yds	=	1 "	25 "	×	150 "	=	.109 "
20 "	×	242 "	=	1 "	2178 square feet			=	.05 "
40 "	×	121 "	=	1 "	4356 "			=	.10 "
80 "	×	60 $\frac{1}{2}$ "	=	1 "	6534 "			=	.15 "
70 "	×	69 $\frac{1}{2}$ "	=	1 "	8712 "			=	.20 "
220 feet	×	198 feet	=	1 "	10890 "			=	.25 "
440 "	×	99 "	=	1 "	13068 "			=	.30 "
110 "	×	369 "	=	1 "	15246 "			=	.35 "
60 "	×	726 "	=	1 "	17424 "			=	.40 "
120 "	×	363 "	=	1 "	19603 "			=	.45 "
240 "	×	181 $\frac{1}{2}$ ft.	=	1 "	21780 "			=	.50 "
200 "	×	108 $\frac{9}{10}$ "	=	$\frac{1}{2}$ "	32670 "			=	.75 "
100 "	×	145 $\frac{2}{10}$ "	=	$\frac{1}{3}$ "	34848 "			=	.80 "

There is a lake of pitch in the island of Trinidad, about a mile and a half in circumference. While the asphaltum near the shores is sufficiently hard at most seasons to sustain men and quadrupeds, it grows soft and warm toward the center, and there it is in a boiling state.



## GRADE PER MILE, TIMBER, ETC.

**GRADE PER MILE**—The following table will show the grade per mile as thus indicated:

An inclination of—

1 foot in 15 is 352 feet per mile	1 foot in 40 is 132 feet per mile
1 " 20 is 264 " "	1 " 50 is 106 " "
1 " 25 is 211 " "	1 " 100 is 53 " "
1 " 30 is 176 " "	1 " 125 is 42 " "
1 " 35 is 151 " "	



**TO FIND THE QUANTITY OF LUMBER IN A LOG**—Multiply the diameter in inches at the small end by one-half the number of inches, and this product by the length of the log in feet, which last product divide by 12.

*Example.* How many feet of lumber can be made from a log 30 inches in diameter and 14 feet long?

$$30 \times 15 = 450 \times 14 = 6300 \div 12 = 525$$

feet. Ans.

**TO TELL THE SOUNDNESS OF TIMBER**—Apply the ear to the middle of one of the ends, while another party strikes the other end. The blow will be clearly and distinctly heard, however long the beam may be, if the wood is sound and of good quality, but if decay has set in, the sound will be muffled and indistinct. The toughest part of a tree will always be found on the side next the north.

**THE NUMBER OF CUBIC FEET IN A ROUND LOG OF UNIFORM DIAMETER**—Square the diameter, in inches, multiply by .7854, and multiply this product by the length in feet, divide by 144, and the quotient is the number of cubic feet.

**NUMBER OF CUBIC FEET IN THE TRUNK OF A STANDING TREE**—Find the circumference in inches, divide by 3.1416, square the quotient, multiply by the length in feet, divide by 144, deduct about one-tenth for thickness of bark, and the result will be, approximately, the number of cubic feet.

Following are some curious facts about fishes. While naturalists have generally accepted Cuvier's view that the existence of fishes is silent, emotionless and joyless, recent observations tend to show that many fishes emit vocal sounds. The *anabas scandens*, the climbing perch of India, quits the water and wanders over banks for considerable distances, and is even said to climb trees and bushes. At Tranquebar, Hindoostan, may be seen the strange spectacle of fish and shell-fish dwelling high on lofty trees. The perch there climbs up tall fan-palms in pursuit of certain shell-fish which form his favorite food. Covered with viscid slime, he glides smoothly over the rough bark. Spines, which he may sheathe and unfold at will, serve him like hands to hang by, and with the aid of side fins and a powerful tail he pushes himself upward. One species of fish, the sticklebacks, are known to build nests. There are several varieties of this fish, all natives of fresh water with one or two exceptions. They are found in the Ottawa River. The cyprinodon is a sightless fish which gropes in the dreary waters of the Mammoth Cave of Kentucky.

ABRAHAM's purchase of the cave of Machpelah is the first recorded commercial transaction.

# BOARD AND PLANK MEASUREMENT AT SIGHT.

This table gives the square feet and inches in boards or planks from 3 to 25 inches wide, and 4 to 20 feet long. If a board be longer than 20 feet, or wider than 25 inches, unite two of the numbers.

LENGTH, -	4 ft.		5 ft.		6 ft.		7 ft.		8 ft.		9 ft.		10 ft.		11 ft.		12 ft.		13 ft.		14 ft.		15 ft.		16 ft.		17 ft.		18 ft.		19 ft.		20 ft.	
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
3 in.....	1.00	1.03	1.06	1.09	1.12	1.15	1.18	1.21	2.03	2.06	2.09	2.12	3.00	3.03	3.06	3.09	3.12	3.15	3.18	3.21	4.00	4.03	4.06	4.09	4.12	4.15	4.18	4.21	5.00	5.03	5.06	5.09	5.12	5.15
4 in.....	1.04	1.08	2.00	2.04	2.08	2.11	2.15	2.18	3.00	3.04	3.08	3.11	4.00	4.04	4.08	4.11	5.00	5.04	5.08	5.11	6.00	6.04	6.08	6.11	7.00	7.04	7.08	7.11	8.00	8.04	8.08	8.11	9.00	9.04
5 in.....	1.08	2.01	2.06	2.11	2.15	2.18	2.21	2.24	3.03	3.07	3.11	3.14	4.04	4.08	4.12	4.15	5.04	5.08	5.12	5.15	6.04	6.08	6.12	7.00	7.04	7.08	7.12	8.00	8.04	8.08	8.12	9.00	9.04	
6 in.....	2.00	2.06	3.00	3.06	4.00	4.06	4.10	4.14	4.18	5.00	5.06	5.10	6.00	6.06	6.10	6.14	7.00	7.06	7.10	7.14	8.00	8.06	8.10	9.00	9.06	9.10	9.14	10.00	10.06	10.10	10.14	11.00	11.06	
7 in.....	2.04	2.11	3.06	3.13	4.08	4.15	4.22	4.29	5.03	5.10	5.17	5.24	6.08	6.15	6.22	6.29	7.04	7.11	7.18	7.25	8.00	8.07	8.14	9.00	9.07	9.14	9.21	10.00	10.07	10.14	10.21	11.00	11.07	
8 in.....	2.08	3.04	4.06	4.08	5.04	5.06	5.10	5.14	6.00	6.08	6.16	6.24	7.04	7.12	7.20	7.28	8.00	8.08	8.16	8.24	9.00	9.08	9.16	10.00	10.08	10.16	10.24	11.00	11.08	11.16	12.00	12.08	12.16	
9 in.....	3.00	3.09	4.00	5.03	6.00	6.09	7.06	8.03	7.06	8.04	9.02	10.00	10.00	11.00	11.00	12.00	12.00	13.00	13.00	14.00	14.00	15.00	15.00	16.00	16.00	17.00	17.00	18.00	18.00	19.00	19.00	20.00	20.00	
10 in.....	3.04	4.02	5.06	5.10	6.08	7.06	8.04	9.02	10.00	11.00	11.00	12.00	12.00	13.00	13.00	14.00	14.00	15.00	15.00	16.00	16.00	17.00	17.00	18.00	18.00	19.00	19.00	20.00	20.00	21.00	21.00	22.00	22.00	
11 in.....	3.08	4.07	5.00	6.05	7.04	8.03	9.02	10.01	11.00	11.00	12.00	12.00	13.00	13.00	14.00	14.00	15.00	15.00	16.00	16.00	17.00	17.00	18.00	18.00	19.00	19.00	20.00	20.00	21.00	21.00	22.00	22.00		
12 in.....	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	12.00	13.00	13.00	14.00	14.00	15.00	15.00	16.00	16.00	17.00	17.00	18.00	18.00	19.00	19.00	20.00	20.00	21.00	21.00	22.00	22.00	23.00	23.00		
13 in.....	4.04	5.05	6.00	7.07	8.08	9.09	10.10	11.11	12.12	12.12	13.13	13.13	14.14	14.14	15.15	15.15	16.16	16.16	17.17	17.17	18.18	18.18	19.19	19.19	20.20	20.20	21.21	21.21	22.22	22.22	23.23	23.23		
14 in.....	4.08	5.11	7.06	8.09	9.04	10.06	11.08	12.09	13.10	13.10	14.11	14.11	15.12	15.12	16.13	16.13	17.14	17.14	18.15	18.15	19.16	19.16	20.17	20.17	21.18	21.18	22.19	22.19	23.20	23.20	24.21	24.21		
15 in.....	5.00	6.03	7.00	8.09	10.00	11.03	12.05	13.06	14.07	14.07	15.08	15.08	16.09	16.09	17.10	17.10	18.11	18.11	19.12	19.12	20.13	20.13	21.14	21.14	22.15	22.15	23.16	23.16	24.17	24.17	25.18	25.18		
16 in.....	5.04	6.08	8.00	9.04	10.08	12.00	13.04	14.08	15.00	15.00	16.01	16.01	17.02	17.02	18.03	18.03	19.04	19.04	20.05	20.05	21.06	21.06	22.07	22.07	23.08	23.08	24.09	24.09	25.10	25.10	26.11	26.11		
17 in.....	5.08	7.01	8.06	9.11	11.04	12.09	13.14	14.18	15.21	15.21	16.02	16.02	17.03	17.03	18.04	18.04	19.05	19.05	20.06	20.06	21.07	21.07	22.08	22.08	23.09	23.09	24.10	24.10	25.11	25.11	26.12	26.12		
18 in.....	6.00	7.06	9.00	10.06	12.00	13.06	14.10	15.15	16.18	16.18	17.01	17.01	18.02	18.02	19.03	19.03	20.04	20.04	21.05	21.05	22.06	22.06	23.07	23.07	24.08	24.08	25.09	25.09	26.10	26.10	27.11	27.11		
19 in.....	6.04	7.11	9.06	11.01	12.08	13.14	14.18	15.23	16.26	16.26	17.02	17.02	18.03	18.03	19.04	19.04	20.05	20.05	21.06	21.06	22.07	22.07	23.08	23.08	24.09	24.09	25.10	25.10	26.11	26.11	27.12	27.12		
20 in.....	6.08	8.04	10.00	11.08	13.04	14.15	15.19	16.24	17.27	17.27	18.03	18.03	19.04	19.04	20.05	20.05	21.06	21.06	22.07	22.07	23.08	23.08	24.09	24.09	25.10	25.10	26.11	26.11	27.12	27.12	28.13	28.13		
21 in.....	7.00	8.09	10.06	12.03	14.00	15.09	16.19	17.22	18.25	18.25	19.04	19.04	20.05	20.05	21.06	21.06	22.07	22.07	23.08	23.08	24.09	24.09	25.10	25.10	26.11	26.11	27.12	27.12	28.13	28.13	29.14	29.14		
22 in.....	7.04	9.02	11.00	12.10	14.08	15.18	16.28	17.31	18.34	18.34	19.05	19.05	20.06	20.06	21.07	21.07	22.08	22.08	23.09	23.09	24.10	24.10	25.11	25.11	26.12	26.12	27.13	27.13	28.14	28.14	29.15	29.15		
23 in.....	7.08	9.07	11.06	13.05	15.04	16.14	17.24	18.27	19.30	19.30	20.06	20.06	21.07	21.07	22.08	22.08	23.09	23.09	24.10	24.10	25.11	25.11	26.12	26.12	27.13	27.13	28.14	28.14	29.15	29.15	30.16	30.16		
24 in.....	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00	24.00	20.00	20.00	21.00	21.00	22.00	22.00	23.00	23.00	24.00	24.00	25.00	25.00	26.00	26.00	27.00	27.00	28.00	28.00	29.00	29.00	30.00	30.00		
25 in.....	8.04	10.05	12.06	14.07	16.08	18.09	20.10	22.11	24.12	24.12	20.10	20.10	21.11	21.11	22.12	22.12	23.13	23.13	24.14	24.14	25.15	25.15	26.16	26.16	27.17	27.17	28.18	28.18	29.19	29.19	30.20	30.20		

**EXPLANATION.**—To ascertain the number of feet, multiply the number of feet in length by the number of inches in width, and divide the product by 12; the result will be the number in feet and inches. Thus, multiply 9 inches wide by 26 feet long, and the result will be 234. Divide this by 12 and we have the product 19 feet and 6 inches.

# Scantling and Timber Measure Reduced to One-Inch Board Measure.

To ascertain the number of feet of scantling or timber, say 18 feet long and 2 by 3 inches: Find 2 by 3 in the top columns, and 18 in the left hand column, and under 2 by 3 and against 18 is 9 feet. If the scantling is longer than contained in the table, add two lengths together. If shorter, take part off same length.

Feet.	THICKNESS AND WIDTH IN INCHES.															
	2x2	2x3	2x4	2x5	2x6	2x7	2x8	2x9	3x3	3x4	3x5	3x6	3x7	3x8	3x9	4x4
6	2.	3.	4.	5.	6.	7.	8.	9.	4.6	6.	7.6	9.	10.6	12.	13.6	8.
7	2.4	3.6	4.8	5.10	7.	8.2	9.4	10.6	5.3	7.	8.9	10.6	12.3	14.	15.9	9.4
8	2.8	4.	5.4	6.8	8.	9.4	10.8	12.	6.	8.	10.	12.	14.	16.	18.	10.
9	3.	4.6	6.	7.6	9.	10.6	12.	13.6	6.9	9.	11.3	13.6	15.9	18.	20.3	12.
10	3.4	5.	6.8	8.4	10.	11.8	13.5	15.	7.6	10.	12.6	15.	17.6	20.	22.6	13.4
11	3.8	5.6	7.4	9.2	11.	12.10	14.8	16.6	8.3	11.	13.9	16.6	19.3	22.	24.9	14.8
12	4.	6.	8.	10.	12.	14.	16.	18.	9.	12.	15.	18.	21.	24.	27.	16.
13	4.4	6.6	8.8	10.10	13.	15.2	17.4	19.6	9.9	13.	16.3	19.6	22.9	26.	29.3	17.4
14	4.8	7.	9.4	11.8	14.	16.4	18.8	21.	10.6	14.	17.6	21.	24.6	28.	31.6	18.8
15	5.	7.6	10.	12.6	15.	17.6	20.	22.6	11.3	15.	18.9	22.6	26.3	30.	33.9	20.
16	5.4	8.	10.8	13.4	16.	18.8	21.4	24.	12.	16.	20.	24.	28.	32.	36.	21.4
17	5.8	8.6	11.4	14.2	17.	19.10	22.8	25.6	12.9	17.	21.3	25.6	29.9	34.	38.3	22.8
18	6.	9.	12.	15.	18.	21.	24.	27.	13.6	18.	22.6	27.	31.6	36.	40.6	24.
19	6.4	9.6	12.8	15.10	19.	22.2	25.4	28.6	14.3	19.	23.9	28.6	33.3	38.	42.9	24.4
20	6.8	10.	13.4	16.8	20.	23.4	26.8	30.	15.	20.	25.	30.	35.	40.	45.	26.8
21	7.	10.6	14.	17.6	21.	24.6	28.	31.6	15.9	21.	26.3	31.6	36.9	42.	47.3	28.
22	7.4	11.	14.8	18.4	22.	25.8	29.4	33.	16.6	22.	27.6	33.	38.6	44.	49.6	29.4
23	7.8	11.6	15.4	19.2	23.	26.10	30.8	34.6	17.3	23.	28.9	34.6	40.3	46.	51.9	30.8
24	8.	12.	16.	20.	24.	28.	32.	36.	18.	24.	30.	36.	42.	48.	54.	32.
25	8.4	12.6	16.8	20.10	25.	29.2	33.4	37.6	18.9	25.	31.3	37.6	43.9	50.	56.3	33.4
30	10.	15.	20.	25.	30.	35.	41.	45.	22.6	30.	37.6	45.	52.6	60.	67.6	40.
34	11.4	17.	22.8	28.4	34.	39.3	45.4	51.	25.6	34.	42.6	51.	59.6	68.	76.6	45.4
40	13.4	20.	26.8	33.4	40.	46.8	53.4	60.	30.	40.	50.	60.	70.	80.	90.	53.

Feet.	THICKNESS AND WIDTH IN INCHES.															
	5x4	4x6	4x7	4x8	4x9	5x5	5x6	5x7	5x3	5x9	6x6	6x7	6x8	6x9	6x10	
6	10.	12.	14.	16.	18.	12.6	15.	17.6	20.	22.6	18.	21.	24.	27.	30.	
7	11.8	14.	16.4	18.8	21.	14.7	17.6	20.5	23.4	26.3	21.	24.6	28.	31.6	35.	
8	13.4	16.	18.8	21.4	24.	16.8	20.	23.4	26.8	30.	24.	28.	32.	36.	40.	
9	15.	18.	21.	24.	27.	18.9	22.6	26.3	30.	33.9	27.	31.6	36.	40.6	45.	
10	16.8	20.	23.4	26.8	30.	20.10	25.	29.2	33.4	37.6	30.	35.	40.	45.	51.	
11	18.4	22.	25.8	29.4	33.	22.11	27.6	32.1	36.8	41.3	33.	38.6	44.	49.6	55.	
12	20.	24.	28.	32.	36.	25.	30.	35.	40.	45.	36.	42.	48.	54.	60.	
13	21.8	26.	30.4	34.8	39.	27.1	32.6	37.11	43.4	48.9	39.	45.6	52.	58.6	65.	
14	23.4	28.	32.8	37.4	42.	29.2	35.	40.10	46.8	52.6	42.	49.	56.	63.	70.	
15	25.	30.	35.	40.	45.	31.3	37.6	43.9	50.	56.3	45.	52.6	60.	67.6	75.	
16	26.8	32.	37.4	42.8	48.	33.4	40.	46.8	53.4	60.	48.	56.	64.	72.	80.	
17	28.4	34.	39.8	45.4	51.	35.5	42.6	49.7	56.8	63.9	51.	59.6	68.	76.6	85.	
18	30.	36.	42.	48.	54.	37.6	45.	52.6	60.	67.6	54.	63.	72.	81.	90.	
19	31.8	38.	44.4	50.8	57.	39.7	47.6	55.5	63.4	71.3	57.	66.6	76.	85.6	95.	
20	33.4	40.	46.8	53.4	60.	41.8	50.	58.4	66.8	75.	60.	70.	81.	90.	100.	
21	35.	42.	49.	56.	63.	43.9	52.6	61.3	70.	78.9	63.	73.6	84.	94.6	105.	
22	36.8	44.	51.4	58.8	66.	45.10	55.	64.2	73.4	82.6	66.	77.	88.	99.	110.	
23	38.4	46.	53.8	61.4	69.	47.11	57.6	67.1	76.8	86.3	69.	80.6	92.	103.6	115.	
24	40.	48.	56.	64.	72.	50.	60.	70.	80.	90.	72.	84.	96.	108.	120.	
25	41.8	50.	58.4	66.8	75.	52.1	62.6	72.11	83.4	93.9	75.	87.	100.	112.6	125.	
30	50.	60.	70.	80.	90.	62.6	75.	87.6	100.	112.6	90.	105.	120.	135.	150.	
34	56.8	68.	79.4	90.8	102.	70.10	85.	99.2	113.4	127.6	102.	119.	136.	153.	170.	
40	66.8	80.	93.4	106.8	120.	83.4	100.	116.8	133.4	150.	120.	140.	160.	180.	200.	

## Logs Reduced to Inch Board Measure

Find the length of the log in feet in the left hand column, and its mean diameter in inches (found by adding the two end diameters and dividing their sum by two) at the heads of the other columns, and trace them until they meet, and the figures so found will express the diameter of feet board measure of inch boards the log will measure.

L. Feet..	Diam. 12	Diam. 13	Diam. 14	Diam. 15	Diam. 16	Diam. 17	Diam. 18	Diam. 19	Diam. 20	Diam. 21	Diam. 22	Diam. 23	Diam. 24	Diam. 25	Diam. 26	Diam. 27	Diam. 28
10	49	61	72	89	99	116	133	151	175	190	209	235	252	277	313	342	363
11	54	67	79	98	109	127	147	165	192	209	230	259	278	315	344	377	400
12	59	73	86	107	119	139	161	180	210	228	251	283	303	344	373	411	436
13	64	79	93	116	129	150	173	195	227	247	272	306	328	373	408	445	473
14	69	85	100	125	139	162	187	210	245	266	292	330	353	401	439	479	509
15	74	91	107	134	149	173	200	225	262	285	313	353	379	430	469	514	545
16	79	97	114	142	159	185	213	240	280	304	334	377	404	459	500	548	582
17	84	103	122	151	168	196	227	255	297	323	355	400	429	478	531	582	618
18	88	109	129	160	178	208	240	270	315	342	376	424	454	516	562	616	654
19	93	116	136	169	188	219	253	285	332	361	397	447	480	545	594	650	692
20	98	122	143	178	198	232	267	300	350	380	418	470	505	573	625	684	728
21	103	128	150	187	208	243	280	315	368	399	439	495	530	602	656	719	764
22	108	134	157	196	218	255	293	330	385	418	460	518	553	631	688	753	800
23	113	140	164	205	228	266	307	345	403	437	480	542	581	659	719	787	837
24	118	146	172	214	238	278	320	360	420	456	501	566	606	688	750	821	873
25	123	152	179	223	248	289	333	375	438	475	522	589	631	717	781	851	910

L. Feet..	Diam. 29	Diam. 30	Diam. 31	Diam. 32	Diam. 33	Diam. 34	Diam. 35	Diam. 36	Diam. 37	Diam. 38	Diam. 39	Diam. 40	Diam. 41	Diam. 42	Diam. 43
10	381	411	448	460	490	500	547	577	644	669	700	752	795	840	872
11	419	451	448	506	539	550	602	634	708	734	770	828	874	924	959
12	457	493	532	552	588	600	670	692	772	801	840	903	954	1007	1046
13	495	537	570	598	637	650	712	750	836	868	910	978	1033	1091	1135
14	533	575	622	644	686	700	766	807	901	934	980	1053	1113	1175	1222
15	571	616	666	690	735	750	821	865	965	1001	1050	1129	1192	1259	1309
16	609	657	710	736	784	800	876	923	1029	1068	1120	1204	1272	1343	1396
17	647	698	755	782	833	850	931	980	1094	1134	1190	1279	1351	1427	1485
18	685	739	799	828	882	900	985	1038	1158	1201	1260	1354	1431	1511	1571
19	723	780	843	874	931	950	1040	1096	1222	1268	1330	1430	1510	1595	1658
20	761	821	888	920	980	1000	1095	1152	1287	1335	1400	1505	1590	1679	1745
21	800	863	932	966	1029	1050	1150	1210	.....	.....	.....	.....	.....	.....	.....
22	838	904	976	1012	1078	1100	1204	1268	.....	.....	.....	.....	.....	.....	.....
23	876	945	1021	1058	1127	1150	1259	1322	.....	.....	.....	.....	.....	.....	.....
24	914	986	1065	1104	1176	1200	1314	1380	.....	.....	.....	.....	.....	.....	.....
25	952	1027	1109	1150	1225	1250	1369	1438	.....	.....	.....	.....	.....	.....	.....

**THE Falls of Niagara** have cut a channel through the solid rocks 200 feet deep, 1,200 to 2,000 feet wide and seven miles long. The evidence is conclusive that the falls were formerly at Queenstown, seven miles below their present situation. It has been shown that they have receded not more than a foot a year for the past half century.

**ALEXANDER THE GREAT** was born in Europe, died in Asia, and was buried in Africa. The preparations for his funeral consumed two years' time. The immense car containing the golden sarcophagus was drawn by sixty-four white mules, richly caparisoned, a distance of a thousand miles—from the Euphrates to the Nile.

### Table For Gold Miners.

To ascertain the quantity of gold in any bulk of ore it is not necessary to reduce the mass. A proportional reduction will suffice, and the following table is based on trials of four hundred grains of ore:

IF 400 GRAINS OF ORE GIVE FINE GOLD,				ONE TON OF ORE WILL YIELD				IF 400 GRAINS OF ORE GIVE FINE GOLD,				ONE TON OF ORE WILL YIELD			
Grains.				Oz.	Dwts	Grs.		Grains.				Oz.	Dwts.	Grs.	
.001 .....				0	1	15		.200 .....				16	6	16	
.002 .....				0	3	6		.300 .....				24	10	0	
.003 .....				0	4	21		.400 .....				32	13	8	
.004 .....				0	6	12		.500 .....				40	16	16	
.005 .....				0	8	4		.600 .....				49	0	0	
.006 .....				0	9	19		.700 .....				57	3	8	
.007 .....				0	11	10		.800 .....				65	6	16	
.008 .....				0	13	1		.900 .....				73	10	0	
.009 .....				0	14	16		1.000 .....				81	13	8	
.010 .....				0	16	8		2.000 .....				163	16	16	
.020 .....				1	12	16		3.000 .....				245	0	0	
.030 .....				2	9	0		4.000 .....				326	13	8	
.040 .....				3	5	8		5.000 .....				408	6	16	
.050 .....				4	1	16		6.000 .....				490	0	0	
.060 .....				4	18	0		7.000 .....				570	13	8	
.070 .....				5	14	8		8.000 .....				653	6	16	
.080 .....				6	10	16		9.000 .....				735	0	0	
.090 .....				7	7	0		10.000 .....				816	13	8	
.100 .....				8	3	8		20.000 .....				1633	6	16	

The sayings of the Seven Wise Men are the famous mottoes inscribed in the temple of Apollo at Delphi: Solon of Athens—"Know thyself." Chilo of Sparta—"Consider the end." Thales of Miletus—"Suretyship is the precursor of ruin." Bias of Priene—"Most men are bad." Cleobulus of Lindus—"Avoid excess." Pittacus of Mitylene—"Know thy opportunity." Periander of Corinth—"Nothing is impossible to industry."

The "Wandering Jew" was last seen in the seventeenth century. On January 1, 1644, he appeared at Paris and created a great sensation among all ranks. He claimed to have lived sixteen hundred years and to have traveled through all regions of the world. He was visited by many prominent personages, and no one could accost him in a language of which he was ignorant. He replied readily and without embarrassment to any questions propounded, and he was never confounded by any amount of cross-questioning. He seemed familiar with the history of persons and events from the time of Christ, and claimed an acquaintance with all the celebrated characters of sixteen centuries. Of himself he said that he was usher of the court of judgment in Jerusalem, where all criminal cases were tried at the time of our Saviour; that his name was Michab Ader; and that for thrusting Jesus out of the hall with these words, "Go, why tarriest thou?" the Messiah answered him, "I go, but tarry thou till I come," thereby condemning him to live till the day of judgment. The learned looked upon him as an impostor or madman, yet took their departure bewildered and astonished.

# NAILS AND SPIKES.

SIZE, LENGTH AND NUMBER TO POUND.

ORDINARY.			CLINCH.		FINISHING.		
Size.	Length. Inches.	No. to Lb.	Length Inches.	No. to Lb.	Size.	Length Inches.	No. to Lb.
2 <sup>d</sup> .....	$\frac{7}{8}$ .....	716	2.....	152	4 <sup>d</sup> .....	$1\frac{3}{4}$ .....	384
3 fine.....	$1\frac{1}{8}$ .....	588	$2\frac{1}{4}$ .....	133	5.....	$1\frac{3}{8}$ .....	256
3.....	$1\frac{1}{8}$ .....	448	$2\frac{1}{2}$ .....	92	6.....	2.....	204
4.....	$1\frac{3}{8}$ .....	336	$2\frac{3}{4}$ .....	72	8.....	$2\frac{1}{2}$ .....	102
5.....	$1\frac{3}{4}$ .....	216	3.....	60	10.....	3.....	80
6.....	2.....	166	$3\frac{1}{4}$ .....	43	12.....	$3\frac{5}{8}$ .....	65
7.....	$2\frac{1}{4}$ .....	118			20.....	$3\frac{7}{8}$ .....	46
8.....	$2\frac{1}{2}$ .....	94	FENCE.		CORR.		
10.....	$2\frac{3}{4}$ .....	72	2.....	96	6 <sup>d</sup> .....	2.....	143
12.....	$3\frac{1}{8}$ .....	50	$2\frac{1}{4}$ .....	66	8.....	$2\frac{1}{2}$ .....	68
20.....	$3\frac{3}{4}$ .....	32	$2\frac{1}{2}$ .....	56	10.....	$2\frac{1}{3}$ .....	60
30.....	$4\frac{1}{4}$ .....	20	$2\frac{3}{4}$ .....	50	12.....	$3\frac{1}{8}$ .....	42
40.....	$4\frac{3}{4}$ .....	17	3.....	40	20.....	$3\frac{3}{4}$ .....	25
50.....	5.....	14	SPIKES.		30.....	$4\frac{1}{4}$ .....	18
60.....	$5\frac{1}{2}$ .....	10	$3\frac{1}{2}$ .....	19	40.....	$4\frac{3}{4}$ .....	14
LIGHT.			4.....	15	W H $2\frac{1}{2}$ ..... 69		
4 <sup>d</sup> .....	$1\frac{3}{8}$ .....	373	$4\frac{1}{2}$ .....	13	W H L $2\frac{1}{4}$ ..... 72		
5.....	$1\frac{3}{4}$ .....	272	5.....	10	SLATE.		
6.....	2.....	196	$5\frac{1}{2}$ .....	9	3 <sup>d</sup> .....	$1\frac{5}{8}$ .....	288
BRADS.			6.....	7	4.....	$1\frac{7}{8}$ .....	244
6 <sup>d</sup> .....	2.....	163	BOAT.		5.....	$1\frac{3}{4}$ .....	187
8.....	$2\frac{1}{2}$ .....	96	$1\frac{1}{2}$ .....	206	6.....	2.....	146
10.....	$2\frac{3}{4}$ .....	74					
12.....	$3\frac{1}{8}$ .....	50					

In the above table *d* stands for penny. This term penny, as applied to nails, is generally supposed to have been derived from pound. It originally meant so many pounds to the thousand; that is, six-penny means six pounds of nails to the thousand.

## Tacks.

Size.	Length.	Number to Pound.	Size.	Length.	Number to Pound.	Size.	Length.	Number to Pound.
1 oz.	$\frac{1}{8}$	16000	4 oz.	$\frac{7}{8}$	4000	14 oz.	$\frac{1}{3}$	1143
$1\frac{1}{2}$	$\frac{3}{8}$	10066	6	$\frac{9}{8}$	2666	16	$\frac{7}{8}$	1000
2	$\frac{1}{4}$	8000	8	$\frac{5}{8}$	2000	18	$\frac{1}{8}$	888
$2\frac{1}{2}$	$\frac{5}{8}$	6400	10	$\frac{1}{2}$	1600	20	1	800
3	$\frac{3}{4}$	5333	12	$\frac{3}{4}$	1333	22	$1\frac{1}{8}$	727

## RAILROAD SPIKES.

Size Measured Under Head.	Average No. per keg of 200 lbs.	Ties two feet between centers, Four spikes per tie, Makes per Mile.	Rail used. Wt. per Yard.
$5\frac{1}{2} \times \frac{9}{16}$	360	5870 lbs.— $29\frac{1}{3}$ kegs.	45 to 70
$5 \times \frac{9}{16}$	400	5170 “ —26 “	40 to 56
$5 \times \frac{1}{2}$	450	4660 “ — $23\frac{1}{3}$ “	35 to 40
$4\frac{1}{2} \times \frac{1}{2}$	530	3960 “ —20 “	28 to 35
$4 \times \frac{1}{2}$	600	3520 “ — $17\frac{2}{3}$ “	24 to 35
$4\frac{1}{2} \times \frac{7}{16}$	680	3110 “ — $15\frac{1}{2}$ “	} 20 to 30
$4 \times \frac{7}{16}$	720	2940 “ — $14\frac{3}{4}$ “	
$3\frac{1}{2} \times \frac{7}{16}$	900	2350 “ — $11\frac{3}{4}$ “	} 16 to 25
$4 \times \frac{3}{8}$	1000	2090 “ — $10\frac{1}{2}$ “	
$3\frac{1}{2} \times \frac{3}{8}$	1190	1780 “ —9 “	} 16 to 20
$3 \times \frac{3}{8}$	1240	1710 “ — $8\frac{1}{2}$ “	
$2\frac{1}{2} \times \frac{3}{8}$	1342	1575 “ — $7\frac{7}{8}$ “	12 to 16

### RAILS REQUIRED PER MILE OF FOLLOWING WEIGHT PER YARD.

Weight per yard.	Tons of 2,240 lbs. per Mile.	Weight per yard.	Tons of 2,240 lbs. per Mile.
16 lbs.	25 tons, 320 lbs.	35 lbs.	55 tons, 0 lbs.
20 “	31 “ 960 “	40 “	63 “ 1920 “
25 “	39 “ 640 “	45 “	70 “ 1600 “
28 “	44 “ 0 “	56 “	88 “ 0 “
30 “	47 “ 320 “	60 “	94 “ 640 “
		65 “	102 “ 320 “
		70 “	110 “ 0 “

CROSS TIES, PER MILE.		SPLICE JOINTS, PER MILE.	
Center to Center.	No. Ties.	Two Bars and Four Bolts and Nuts to each Joint.	
$1\frac{1}{2}$ Feet.....	3520	Rails, 20 feet long, 528 joints.	
$1\frac{3}{4}$ “ .....	3017	“ 24 “ “	440 “
2 “ .....	2640	“ 26 “ “	406 “
$2\frac{1}{4}$ “ .....	2348	“ 28 “ “	378 “
$2\frac{1}{2}$ “ .....	2113	“ 30 “ “	352 “

### Nails Required for Different Kinds of Work.

- For 1,000 shingles,  $3\frac{1}{2}$  to 5 lbs. 4d. nails, or 3 to  $3\frac{1}{2}$  lbs. 3d.
- 1,000 laths, about 6 lbs. 3d. fine.
- 1,000 feet clapboards, about 18 lbs. 6d. box.
- 1,000 feet covering boards, about 20 lbs. 8d. common, or 25 lbs. 10d.
- 1,000 feet upper floors, square edged, about 38 lbs. 10d. floor, or 41 lbs. 12d. floor.
- 1,000 feet upper floors, matched and blind-nailed, 38 lbs. 10d., or 42 lbs. 12d. common.
- 10 feet partitions, studs or studding, 1 lb. 10d. common.
- 1,000 feet furring, 1 x 3, about 45 lbs. 10d. common.
- 1,000 feet furring, 1 x 2, about 65 lbs. 10d. common.
- 1,000 feet pine finish, about 30 lbs. 8d. finish.

## Brick Required to Construct Any Building.

(Reckoning 7 brick to each superficial foot.)

Superficial Feet of Wall.	Number of Bricks to Thickness of					
	4 in.	8 in.	12 in.	16 in.	20 in.	24 in.
1 .....	7	15	23	30	38	45
2 .....	15	30	45	60	75	90
3 .....	23	45	68	90	113	135
4 .....	30	60	90	120	150	180
5 .....	38	75	113	150	188	225
6 .....	45	90	135	180	225	270
7 .....	53	105	158	210	263	315
8 .....	60	120	180	240	300	360
9 .....	68	135	203	270	338	405
10 .....	75	150	225	300	375	450
20 .....	150	300	450	600	750	900
30 .....	225	450	675	900	1125	1350
40 .....	300	600	900	1200	1500	1800
50 .....	375	750	1125	1500	1875	2250
60 .....	450	900	1350	1800	2250	2700
70 .....	525	1050	1575	2100	2625	3150
80 .....	600	1200	1800	2400	3000	3600
90 .....	675	1350	2025	2700	3375	4050
100 .....	750	1500	2250	3000	3750	4500
200 .....	1500	3000	4500	6000	7500	9000
300 .....	2250	4500	6750	9000	11250	13500
400 .....	3000	6000	9000	12000	15000	18000
500 .....	3750	7500	11250	15000	18750	22500
600 .....	4500	9000	13500	18000	22500	27000
700 .....	5250	10500	15750	21000	26250	31500
800 .....	6000	12000	18000	24000	30000	36000
900 .....	6750	13500	20250	27000	33750	40500
1000 .....	7500	15000	22500	30000	37500	45000

### Facts for Builders.

1,000 shingles, laid 4 inches to the weather, will cover 100 sq. ft. of surface, and 5 lbs. of shingle nails will fasten them on.

One-fifth more siding and flooring is needed than the number of square feet of surface to be covered, because of the lap in the siding and matching.

1,000 laths will cover 70 yards of surface, and 11 lbs. of lath nails will nail them on. Eight bushels of good lime, 16 bushels of sand, and 1 bushel of hair will make enough good mortar to plaster 100 square yards.

A cord of stone, 3 bushels of lime, and a cubic yard of sand, will lay 100 cubic feet of wall.

Cement 1 bushel and sand 2 bushels will cover  $3\frac{1}{2}$  square yards 1 inch thick,  $4\frac{1}{2}$  square yards  $\frac{3}{4}$  inch thick,  $6\frac{3}{4}$  square yards  $\frac{1}{2}$  inch thick. 1 bu. cement and one of sand will cover  $2\frac{1}{4}$  square yards 1 inch thick, 3 square yards  $\frac{3}{4}$  inch thick, and  $4\frac{1}{2}$  square yards  $\frac{1}{2}$  inch thick.



## FACTS FOR BUILDERS.

Five courses of brick will lay 1 foot in height on a chimney. 8 bricks in a course will make a flue 4 ins. wide and 12 ins. long, and 16 bricks in a course will make a flue 8 ins. wide and 16 ins. long.

Twenty-two cubic feet of stone, when built into the wall, is 1 perch.

Three pecks of lime and four bushels of sand are required to each perch of wall.

There are 20 common bricks to a cubic foot when laid; and 15 common bricks to a foot of 8-inch wall when laid.

Fifty feet of boards will build one rod of fence five boards high, first board being 10 inches wide, second 8 inches, third 7 inches, fourth 6 inches, fifth 5 inches.

### Useful Facts for Bricklayers and Plasterers.

The average weight of smaller-sized bricks is about 4 lbs.; of the larger about 6 lbs.

Dry bricks will absorb about one-fifteenth of their weight in water.

A load of mortar measures a cubic yard, or 27 cubic ft.; requires 2 cubic yard of sand and 9 bus. of lime and will fill 30 hods.

A bricklayer's hod 1 ft. 4 in. by 9 in. by 9 in. equals 1,296 cubic in. in capacity, and contains 20 bricks.

A single load of sand and other materials equals a cubic yard, or 27 cubic ft.; a double load twice that quantity.

One thousand bricks, closely stacked, occupy about 56 cubic ft. One thousand old bricks, cleaned and loosely stacked, occupy about 72 cubic feet.

One superficial foot of gauged arches requires ten bricks.

One superficial foot of facings requires seven bricks.

One yard of paving requires 36 stock bricks laid flat, or 52 on edge, and 36 paving bricks laid flat, or 82 on edge.

The bricks of different makers vary in dimensions, and those of the same maker vary also, owing to varying degrees of heat in burning. The calculations given above are therefore approximate.

One hundred yards of plastering will require 1,400 laths,  $4\frac{1}{2}$  bus. lime, four-fifths of a load of sand, 9 lbs. hair, and 6 lbs. nails, for two-coat work.

Three men and one helper will put on 450 yards, in a day's work, of two-coat work, and will put on a hard finish for 300 yards.

A bushel of hair weighs, when dry, about 15 lbs.

**PUTTY, FOR PLASTERING**, is a very fine cement made of lime only. It is thus prepared: Dissolve in a small quantity of water, as two or three gallons, an equal quantity of fresh lime, constantly stirring it with a stick until the lime be entirely slacked, and the whole becomes of a suitable consistency, so that when the stick is taken out of it, it will but just drop therefrom; this, being sifted or run through a hair sieve, to take out the gross parts of the lime, is fit for use. Putty differs from fine stuff in the manner of preparing it, and its being used without hair.

## ESTIMATES OF MATERIALS.

**TO FIND THE NUMBER OF BRICKS REQUIRED IN A BUILDING**  
—Rule—Multiply the number of cubic feet by  $22\frac{1}{2}$ . The number of cubic feet is found by multiplying the length, height and thickness (in feet) together. Bricks are usually made 8 inches long, 4 inches wide and 2 inches thick; hence it requires 27 bricks to make a cubic foot without mortar, but it is generally assumed that the mortar fills  $\frac{1}{6}$  of the space.

**ESTIMATES OF MATERIALS.**— $3\frac{1}{2}$  barrels of lime will do 100 square yards plastering, two coats.

2 barrels of lime will do 100 square yards plastering, one coat.

$1\frac{1}{2}$  bushels of hair will do 100 square yards plastering.

$\frac{1}{4}$  yards good sand will do 100 square yards plastering.

$\frac{1}{2}$  barrel of plaster (stucco) will hard-finish 100 square yards plastering.

1 barrel of lime will lay 1,000 bricks. (It takes good lime to do it)

2 barrels of lime will lay 1 cord rubble stone

$\frac{1}{2}$  barrel of lime will lay 1 perch rubble stone estimating  $\frac{1}{4}$  cord to perch).

To every barrel of lime estimate about  $\frac{3}{8}$  yards of good sand for plastering and brick work.

**MASON WORK—BRICK.**— $1\frac{1}{8}$  barrels lime and  $\frac{5}{8}$  yard sand will lay 1,000 brick.

One man with  $1\frac{1}{4}$  tenders will lay 1,800 to 2,000 brick per day.

**RUBBLE.**— $1\frac{1}{4}$  barrels lime and 1 yard of sand will lay 100 feet of stone.

One man will lay 150 feet of stone per day with one tender.

**CEMENT.**— $1\frac{1}{4}$  barrels cement and  $\frac{3}{4}$  yard sand will lay 100 feet rubble stone. Same time as to mason and tender as rubble.

**FLOOR, WALL AND ROOF MEASURE.**—To find the number of square yards in a floor or wall: Rule—Multiply the length by the width or height (in feet) and divide the product by 9; the result will be square yards.

**BIG SALARIES.**—There are a score of men in New York who are paid as much for their services each year as the President of the United States. Forty thousand dollars a year is a very tidy salary. There are hundreds of men who get \$25,000 a year salary, and the number who get from \$10,000 to \$20,000 are legion. Very ordinary men get from \$5,000 to \$8,000 a year, or as much as a Cabinet officer. Dr. Norvin Green, president of the Western Union Telegraph Company, is paid \$50,000. So is Chauncey M. Depew, president of the New York Central Railroad. Richard M. McCurdy, president of the Mutual Life Insurance Company, gets a like amount. John Hoey, president of Adams Express Company, fares equally as well. President Henry B. Hyde, of the Equitable Life Insurance Company, is also on the list. George G. Williams, president of the Chemical National Bank, the richest banking institution in America, with nearly \$5,000,000 of surplus, \$20,000,000 average deposits, is paid a salary of \$25,000 yearly. President Potts of the Paris Bank and President Tappan of the Gallatin National Bank receive a like sum each twelve months. The best paid minister in New York is Dr. John Hall, a brainy man from the north of Ireland, who preaches to \$20,000,000 every Sunday. His is the smallest church in town. He owes his rise in life to Robert Bonner of the *Ledger*, who found him preaching to a small delegation in Dublin, and induced him to come to America. He gets a salary of \$20,000 a year and makes \$5,000 by his newspaper and magazine articles. He is given a luxuriously furnished house as well. Dr. Morgan Dix, the chief pastor of Trinity Church corporation, the wealthiest in America, receives \$15,000 yearly. Dr. William L. Taylor, of the Broadway Tabernacle, gets the same amount. He does literary work and lecturing that brings his income up to \$20,000. Dr. Charles Hall, of the Fifth Avenue Presbyterian Church, is paid \$15,000. He is very eloquent, and his church is crowded at all services. Dr. Parkhurst, of Madison Square Church, gets \$12,000. He has a large and distinguished congregation. Cyrus W. Field is one of the pillars of the church. Dr. Paxton, who preaches to Jay Gould and others less wealthy, is paid \$15,000. The Rev. Robert Collyer, the blacksmith preacher, is paid \$10,000.

# BUILDERS' ESTIMATING TABLES.

Quantity of material in every four lineal feet of exterior wall in a balloon frame building, height of wall being given :

Length of Studs.	Size of Sills.	Size of Studs, Braces, etc.	Quantity of Rough Lumber.	Quantity of Inch Boarding.	Siding in sup. feet.	Tar Paper in sup. feet.
8	6x 6	2x4 Studs	42	36	40	74
10	6x 8	4x4 Braces	52	44	50	80
12	6x10	4x4 Plates	62	53	60	96
14	6x10	1x6 Ribbons	69	62	70	112
16	8x10		82	71	80	128
18	8x10	Studs	87	80	90	144
20	8x12	16 inches from centers	98	88	100	160
22	9x12		109	97	110	176
24	10x12		119	106	120	192
18	10x10	2x6 Studs	122	80	90	144
20	10x12	6x6 Braces	137	88	100	160
22	10x12	4x6 Plates	145	97	110	176
24	12x12	1x6 Ribbons	162	106	120	192
26	10x14		169	114	130	208
28	10x14	Studs 16 inch centers	176	123	140	224
30	12x14		198	132	150	240

Amount of lumber in rafters, collar-piece and boarding, and number of shingles to four lineal feet of roof, measured from eave to eave over ridge.

Rafters 16-inch centers :

Width of House, Feet.	Size of Rafters.	Size of Collar-piece.	Quantity of Lumber in Rafter and Collar-piece.	Quantity of Boarding, Feet.	No. of Shingles.
14	2x4	2x4	39	91	560
16	2x4	2x4	45	70	640
18	2x4	2x4	50	79	720
20	2x4	2x4	56	88	800
22	2x4	2x4	62	97	880
24	2x4	2x4	67	106	960
26	2x6	2x6	84	88	800
28	2x6	2x6	92	97	880
30	2x6	2x6	101	106	960
	2x6	2x6	109	115	1040
	2x6	2x6	117	124	1120
	2x6	2x6	126	133	1200

## COMPARATIVE STRENGTH OF TIMBER AND CAST IRON.

Table showing the transverse strength of timber and of cast iron one foot long and one inch square.

MATERIAL.	Breaking Weight, lbs.	Weight Borne with Safety, lbs.
Ash, seasoned.....	175	105
Chestnut, seasoned.....	170	115
Hickory, seasoned.....	270	200
White Oak, seasoned.....	240	195
White Pine, seasoned.....	135	95
Yellow Pine, seasoned.....	150	100
Iron (cast).....	5,781	4,000

## HOW TO USE CEMENT.

The following general rules referring to the practical use of cement will be found convenient for reference:

**Quality of Sand**—The sand should be clean, sharp and coarse. When the sand is mixed with loam the mortar will set comparatively slow, and the work will be comparatively weak. Fine sand, and especially water-worn sand, delays the setting of the cement, and deteriorates strength. Damp sand should not be mixed with dry cement, but the cement and sand should be mixed thoroughly and uniformly together, when both are dry, and no water should be applied until immediately before the mortar is wanted for use.

**Proportion of Sand**—The larger the proportion of cement the stronger the work. One part of good cement to two parts sand is allowable for ordinary work; but for cisterns, cellars, and work requiring special care, half and half is the better proportion. For floors, the cement should be increased toward the surface.

**Water in Concrete**—Use no more water in cement than absolutely necessary. Cement requires but a very small quantity of water in crystalizing. Merely dampening the material gives the best results. Any water in excess necessarily evaporates and leaves the hardened cement comparatively weak and porous.

**Concrete in Water**—Whenever concrete is used under water, care must be taken that the water is still. So say all English and American authorities. In laying cellar floors, or constructing cisterns or similar work, care must also be taken to avoid *pressure of exterior water*. Cement will not crystalize when disturbed by the force of currents, or pressure of water, but will resist currents and pressure after hardening only. In still water, good cement will harden quicker than in air, and when kept in water will be stronger than when kept in air. Cements which harden especially quick in air are usually slow or worthless in water.

**How to Put Down Concrete**—When strong work is wanted, for cellar floors and all similar work, the concrete should be dampened and tamped down to place, with the back of a spade, or better, with the end of a plank or rammer; then finished off with a trowel, thus leveling and compacting the work. Only persons ignorant of the business will lay a floor or walk with soft cement mortar. All artificial stone is made in a similar way to that described, and, when set, is strong and hard as stone.

**Delay in Use**—Do not permit the mortar to exhaust its setting properties by delaying its use when ready. Inferior cements only will remain standing in the mortar-bed any length of time without serious injury.

**Stone and Brick Work**—In buildings constructed of stone or brick, the best protection from dampness and decay, and also from the danger of cyclones, is a mortar of cement and coarse sand. The extra cost is inconsiderable, and the increased value of the structure very great. Chimneys laid in this manner never blow down, and cellars whose foundations are thus laid are always free from atmospheric moisture. Cement may also be mixed with lime mortar for plastering and other purposes, to great advantage.

**Effect of Frost and Cold**—At a temperature less than 60 degrees Fahrenheit, all good cement sets slowly, though surely, but if allowed to freeze its value is seriously impaired. In cold weather or cold water do not fear to wait for your concrete to crystalize.

**Damage from Moisture**—Good cement is not injured by age, if carefully preserved from moisture. Lumps in bags or barrels of cement are caused by exposure to moisture. They prove the originally good quality of the cement.

**THE Ramphorhyncus**, the remains of which have been found in the quarries of Solenhofen, Germany, was a curious intermediate link between birds and reptiles. Its tail, a singular appendage, was long, reptile-like, and dragged upon the ground, while its footprints were bird-like.

**JOHN VERRAZANNI**, an eminent Florentine navigator, in 1524, landed where the lower extremity of New York City is, and giving the natives some spirituous liquors made many of them drunk. The Indians called the place *Manna-ha-ta*, or "place of drunkenness," and they were afterwards called *Manna-ha-tans*.

# USEFUL TABLES FOR PLUMBERS, ETC.

## SIZES AND WEIGHTS OF LEAD PIPE.

CALIBRE.	Weight per foot.		CALIBRE.	Weight per foot.	
	LBS.	OZ.		LBS.	OZ.
$\frac{3}{8}$ inch Tubing.....		1 $\frac{1}{4}$	$1\frac{1}{4}$ inch Strong.....	4	12
$\frac{1}{2}$ inch Tubing.....		3	Ex. Strong.....	6	
$\frac{5}{8}$ inch Tubing.....		4	Ex. Ex. Strong.....	6	12
$\frac{1}{4}$ inch Tubing.....		6	$1\frac{1}{2}$ inch Aqueduct.....	3	
Fish Seine.....	15		Ex. Light.....	3	8
$\frac{3}{8}$ inch Aqueduct.....	8		Light.....	4	
Ex. Light.....	9		Medium.....	5	
Light.....	12		Strong.....	6	
Medium.....	1	8	Ex. Strong.....	7	8
Strong.....	1		Ex. Ex. Strong.....	9	
Ex. Strong.....	2		$1\frac{3}{4}$ inch Ex. Light.....	3	12
$\frac{1}{2}$ inch Aqueduct.....		10	Light.....	4	8
Ex. Light.....		12	Medium.....	5	8
Light.....	1	4	Strong.....	6	8
Medium.....	1		Ex. Strong.....	8	
Strong.....	1	12	2 inch Waste.....	3	
AA.....	2		Ex. Light.....	4	
Ex. Strong.....	2	8	Light.....	5	
Ex. Ex. Strong.....	3		Medium.....	7	
$\frac{3}{8}$ inch Aqueduct.....		12	Strong.....	8	
Ex. Light.....	1	4	Ex. Strong.....	9	
Light.....	1	12	Ex. Ex. Strong.....	10	8
Medium.....	2		$2\frac{1}{2}$ inch Waste.....	4	
Strong.....	2	8	Light.....	6	
Ex. Strong.....	3		$\frac{3}{8}$ thick.....	8	
Ex. Ex. Strong.....	3	8	$\frac{1}{4}$ thick.....	11	
$\frac{3}{4}$ inch Aqueduct.....	1		$\frac{5}{8}$ thick.....	14	
Ex. Light.....	1	8	$\frac{3}{4}$ thick.....	17	
Light.....	2		3 inch Waste.....	3	
Medium.....	2	4	Waste.....	3	12
Strong.....	3		Light.....	5	
Ex. Strong.....	3	8	$\frac{3}{8}$ thick.....	9	
Ex. Ex. Strong.....	4		$\frac{1}{4}$ thick.....	12	
$\frac{7}{8}$ inch Aqueduct.....	1	8	$\frac{5}{8}$ thick.....	16	
Ex. Light.....	2		$\frac{3}{4}$ thick.....	20	
Light.....	2	8	$3\frac{1}{2}$ inch Waste.....	5	
Medium.....	3		$\frac{1}{4}$ thick.....	15	
Strong.....	3	8	$\frac{3}{8}$ thick.....	18	
Ex. Strong.....	3	8	$\frac{1}{2}$ thick.....	21	
Ex. Ex. Strong.....	4	12	$\frac{5}{8}$ thick.....	25	
$1\frac{1}{4}$ inch Aqueduct.....	1	8	$4\frac{1}{2}$ inch Waste.....	6	
Ex. Light.....	2		5 inch Waste.....	8	
Light.....	2	8	6 inch Waste.....	10	
Medium.....	3	4			
Strong.....	4				
Ex. Strong.....	4	12			
Ex. Ex. Strong.....	5	8			
$1\frac{1}{2}$ inch Aqueduct.....	2				
Ex. Light.....	2	8			
Light.....	3				
Medium.....	3	12			

SEEST thou a man diligent in his business? He shall stand before kings; he shall not stand before mean men.—OLD TESTAMENT,

# **SIZES AND WEIGHTS OF PURE BLOOK TIN PIPE.**

3-6 in.....	4 oz.	3/4 in.....	7 oz. and 12 oz.
1/4-16 ".....	4 oz. and 6 oz.	1 ".....	12 " and 16 "
3/8 ".....	5 " " 8 "	1 1/4 ".....	1 1/4 lb. and 1 3/4 lb.
1/2 ".....	4 " " 6 "	1 1/2 ".....	1 1/2 " " 2 "
5/8 ".....	6 " " 8 "	2 ".....	2 " " 3 "
3/4 ".....	9 " " 12 "		

## **WEIGHT PER SQUARE FOOT OF SHEET LEAD.**

1-32 in. thick.....	2 lbs.	1-10 in. thick.....	7 lbs.
3-64 ".....	2 1/2 "	1/8 ".....	8 "
1-25 ".....	3 "	5-32 ".....	10 "
1-16 ".....	4 "	3-16 ".....	12 "
1-14 ".....	5 "	7-32 ".....	14 "
1-12 ".....	6 "	1/4 ".....	16 "

## **WEIGHT PER JOINT OF LEAD AND GASKET FOR STREET MAINS.**

	Lead.	Gasket.		Lead.	Gasket.
2-inch Pipe,	3.25 lbs.,	0.050 lbs.	10-inch Pipe,	15 lbs.,	0.30 lbs.
3-inch " "	4.72 "	0.075 "	12-inch " "	20 "	0.35 "
4-inch " "	6. " "	0.115 "	16-inch " "	25 "	0.45 "
6-inch " "	9. " "	0.175 "	18-inch " "	29 "	0.52 "
8 inch " "	12. " "	0.250 "	20-inch " "	43 "	0.60 "

## **CAPACITY OF DRAIN-PIPE.**

SIZE OF PIPE.	GALLONS PER MINUTE.							
	1/2 in. Fall per 100 feet.	3-in. Fall per 100 feet.	6-in. Fall per 100 feet.	9-in. Fall per 100 feet.	12-in. Fall per 100 feet.	18-in. Fall per 100 feet.	24-in. Fall per 100 feet.	36-in. Fall per 100 feet.
3-inch.	21	30	42	52	60	74	85	104
4 " "	36	52	76	92	108	132	148	184
6 " "	84	120	169	206	240	294	338	414
9 " "	232	330	470	570	660	810	930	1140
12 " "	470	680	960	1160	1360	1670	1920	2350
15 " "	830	1180	1680	2040	2370	2920	3340	4100
18 " "	1300	1850	2630	3200	3740	4600	5270	6470
20 " "	1760	2450	3450	4180	4860	5980	6850	8410

The maximum rainfall is about one inch per hour (except during very heavy storms)—equal to 22,633 gallons an hour for each acre, or 377 gallons a minute per acre.

**Avoid shame, but do not seek glory—nothing so expensive as glory.—SIDNEY SMITH.**

**THAT** this nation, under God, shall have a new birth of freedom, and that government of the people, by the people, for the people, shall not perish from the earth.—**ABRAHAM LINCOLN.**

## HINTS FOR ROOFERS.

The average width of a shingle is four inches. Hence, when shingles are laid four in. to the weather each shingle averages 16 sq. in., and 900 are required for a square of roofing (100 sq. ft.). If  $4\frac{1}{2}$  in. to the weather, 800; 5 in., 720;  $5\frac{1}{2}$  in., 655; 6 in., 600. In hip-roofs, where the shingles are cut more or less to fit the roof, 5% should be added to these figures.

One thousand shingles laid four inches to the weather will require five pounds of shingle nails. Six pounds of 4d nails will lay 1000 split pine shingles.

A carpenter will carry up and lay on the roof from 1,500 to 2,000 shingles per day, or two squares to two squares and a half of plain gable-roofing.

The pitch of a slated roof should be about one in height to four in length. The usual lap is about 3 in., sometimes 4 in. Each slate should be fastened by two 3d slate nails, either of galvanized iron, copper or zinc. On roofs of gas-houses the nails should be of copper or yellow metal.

The sides and bottom edges of roof slates should be trimmed, and the nail-holes punched as near the head as possible. When slates are not of uniform size they should be sorted, and the smallest placed near the ridge.

In a first-class slate roof the top course on ridge, and the slate from two to four feet from gutters, and one foot each way from valleys and hips, should be bedded in elastic cement.

Roof-boards for slate roofs should be covered with one or two thicknesses of tarred felt roofing paper before slates are laid. Dry or rosin-sized felt should not be used on roofs.

### Number of Slates per Square.

Size in Inches.	Slates per Square.	Size in Inches.	Slates per Square.	Size in Inches.	Slates per Square.
6 x 12	533	8 x 16	277	12 x 20	141
7 x 12	457	9 x 16	246	14 x 20	121
8 x 12	400	10 x 16	221	11 x 22	137
9 x 12	355	9 x 18	213	12 x 22	126
7 x 14	374	10 x 18	192	14 x 22	108
8 x 14	327	12 x 18	160	12 x 24	114
9 x 14	291	10 x 20	169	14 x 24	98
10 x 14	261	11 x 20	154	16 x 24	86

### Number of Shingles Required in a Roof.

To the square foot, it takes 9 if exposed 4 inches; 8 if exposed  $4\frac{1}{2}$  inches, and 7 1-5 if exposed 5 inches to the weather.

Find the number of shingles required to cover a roof 38 ft. long and the rafters on each side 14 ft. Shingles exposed  $4\frac{1}{2}$  inches.

$$28 \times 38 = 1064 \text{ (sq. ft.)} \times 8 = 8512 \text{ shingles. Ans.}$$

To find the length of rafters, giving the roof one-third pitch, take three-fifths of the width of the building. If the building is 30 feet wide, they must be 18 feet long, exclusive of projection.

A tin roof, properly put on, and kept painted, will last thirty

## HINTS FOR ROOFERS.

years. It ought not to be painted for the first time until it has been on about thirty days, so as to get the grease off the tin, and all the rosin should be carefully scraped off.

It is sometimes necessary, on buildings where there is much dampness or steam, as stables, blacksmith shops, round-houses, etc., to paint the roof tin one coat on the under side before laying.

Tin roofs should be laid with cleats, and not by driving the nails through the tin itself.

There are two kinds of tin—"bright tin," the coating of which is all tin, that is, the tin proper; and "tern," "leaded," or "roofing" tin, the coating of which is a composition, part tin and part lead. This last is a little cheaper, and will not rust any quicker, but the sulphur in soft coal smoke eats through the "leaded" coating sooner than through the "tinned."

There are two sizes of tin, 10x14 and 14x20, and two grades of thickness—IC light, and IX, heavy. For a steep roof (one-sixth pitch or over) the IC 14x20 tin ("leaded" if high up where little smoke will get to it; "bright" if low down), put on with a standing groove, and with the cross-beams put together with a double lock, makes as good a roof as can be made. For flat roofs IX 10x14 "light" is best, laid with cleats, but the others make good roofs and any of them will last 25 years at least.

**NUMBER OF SQUARE FEET A BOX OF ROOFING TIN WILL COVER.**—For flat seam roofing, using  $\frac{1}{2}$ -inch locks, a box of "14x20" size will cover about 192 square feet, and for standing seam, using  $\frac{3}{8}$ -inch locks and turning  $1\frac{1}{4}$  and  $1\frac{1}{2}$  inches edges, making 1-inch standing seams, it will lay about 168 square feet.

For flat seam roofing, using  $\frac{1}{2}$ -inch locks, a box of "28x20" size will cover about 399 square feet, and for standing seam, using  $\frac{3}{8}$ -inch locks and turning  $1\frac{1}{4}$  and  $1\frac{1}{2}$  inches edges, making 1-inch standing seams, it will lay about 365 square feet.

Every box of roofing plates (IC or IX "14x20" or "28x20" sizes) contains 112 sheets.

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### Facts About Gas.

A cubic foot of good gas, from a jet one thirty-third of an inch in diameter and a flame of four inches, will burn 65 minutes.

Internal lights require four cubic feet, and external lights about five cubic feet, per hour. Large or Argand burners will require from six to ten feet.

In distilling 56 pounds of coal, the volume of gas produced in cubic feet, when the distillation was effected in three hours, was 41.3; in seven hours, 37.5; in twenty hours, 33.5; in twenty-five hours, 31.7.

A retort produces about 600 cubic feet of gas in five hours, with a charge of about one and a half cwt. of coal, or 2,800 cubic feet in twenty-four hours.



## PAINTING AND GLAZING.

Painters' work is generally estimated by the square yard, and the cost depends on the number of coats applied, quality of work and material to be painted.

One coat, or *priming*, will take, per 100 yards of painting, 20 pounds of lead and 4 gallons of oil. Two-coat work, 40 pounds of lead and 4 gallons of oil. Three-coat, the same quantity as two-coat; so that a fair estimate for 100 yards of three-coat work would be 100 pounds of lead and 16 gallons of oil.

One gallon priming color will cover 50 superficial yards; white zinc, 50 yds.; white paint, 44 yds.; lead color, 50 yds.; black paint, 50 yds.; stone color, 44 yds.; yellow paint, 44 yds.; blue color, 45 yds.; green paint, 45 yds.; bright emerald green, 25 yds.; bronze green, 75 yds.

One pound of paint will cover about 4 superficial yards the first coat, and about 6 each additional coat. One pound of putty, for stopping, every 20 yards. One gallon of tar and 1 lb. of pitch will cover 12 yards superficial the first coat, and 17 yards each additional coat. A square yard of new brick wall requires, for the first coat of paint in oil,  $\frac{3}{4}$  lb.; for the second, 3 lbs.; for the third, 4 lbs.

A day's work on the outside of a building is 100 yards of first coat, and 80 yds. of either second or third coat. An ordinary door, including casings, will, on both sides, make 8 to 10 yds. of painting, or about 5 yds. to a door without the casings. An ordinary window makes about  $2\frac{1}{2}$  or 3 yds.

WINDOW GLASS is sold by the box, which contains, as nearly as possible, 50 sq. ft., whatever the size of the panes. The thickness of ordinary, or "single thick" window glass is about one-sixteenth of an inch, and of "double thick" nearly  $\frac{1}{8}$  in. The tensile strength of common glass varies from 2,000 to 3,000 lbs. per sq. in., and its crushing strength from 6,000 to 10,000 lbs.

Where SKYLIGHTS are glazed with clear or double thick glass, it may be used in lengths of from 16 to 30 in. by a width of from 9 to 15 in. A lap of at least an inch and a half is necessary for all joints. This is the cheapest mode of glazing. The best, however, for skylight purposes is fluted or rough plate glass. The following thicknesses are recommended as proportionate to sizes: 12x48, 3-16 in.; 15x60,  $\frac{1}{4}$  in.; 20x100,  $\frac{3}{8}$  in.; 94x156,  $\frac{1}{2}$  in.

POLISHED FRENCH PLATE WINDOW GLASS, which is the highest grade of window glass in the market, may be obtained in lights ranging in size from one inch square upwards. Owing to the extra cost of rolling large lights the price of these per square foot is sometimes double that of smaller lights.

FAITH is the substance of things hoped for, the evidence of things unseen.—NEW TESTAMENT.

## PANES OF WINDOW GLASS IN A BOX OF 50 FEET.

Size, in inches.	Panes in box.	Size, in inches.	Panes in box.	Size, in inches.	Panes in box.	Size, in inches.	Panes in box.
6 x 8	150	12 x 19	32	16 x 20	23	24 x 44	7
7 x 9	115	12 x 20	30	16 x 22	20	24 x 50	6
8 x 10	90	12 x 21	29	16 x 24	19	24 x 56	5
8 x 11	82	12 x 22	27	16 x 30	15	26 x 36	8
8 x 12	75	12 x 23	26	16 x 36	12	26 x 40	7
9 x 10	80	12 x 24	25	16 x 40	11	26 x 48	6
9 x 11	72	13 x 14	40	18 x 20	20	26 x 54	5
9 x 12	67	13 x 15	37	18 x 22	18	28 x 34	8
9 x 13	62	13 x 16	35	18 x 24	17	28 x 40	6
9 x 14	57	13 x 17	33	18 x 26	15	28 x 46	6
9 x 15	53	13 x 18	31	18 x 34	12	28 x 50	5
9 x 16	50	13 x 19	29	18 x 36	11	30 x 40	6
10 x 10	72	13 x 20	28	18 x 40	10	30 x 44	4
10 x 12	60	13 x 21	26	18 x 44	9	30 x 48	5
10 x 13	55	13 x 22	25	20 x 22	16	30 x 54	5
10 x 14	52	13 x 24	23	20 x 24	15	32 x 42	5
10 x 15	43	14 x 15	34	20 x 25	14	32 x 44	5
10 x 16	45	14 x 16	32	20 x 26	14	32 x 46	5
10 x 17	42	14 x 18	29	20 x 28	13	32 x 48	5
10 x 18	40	14 x 19	27	20 x 30	12	32 x 50	4
11 x 11	59	14 x 20	26	20 x 34	11	32 x 54	4
11 x 12	55	14 x 22	23	20 x 36	10	32 x 56	4
11 x 13	50	14 x 24	22	20 x 40	9	32 x 60	4
11 x 14	47	14 x 28	19	20 x 44	8	34 x 40	5
11 x 15	44	14 x 32	16	20 x 50	7	34 x 44	5
11 x 16	41	14 x 36	14	22 x 24	14	34 x 46	5
11 x 17	39	14 x 40	13	22 x 26	13	34 x 50	4
11 x 18	36	15 x 16	30	22 x 28	12	34 x 52	4
12 x 12	50	15 x 18	27	22 x 36	9	34 x 56	4
12 x 13	46	15 x 20	24	22 x 40	8	36 x 44	5
12 x 14	43	15 x 22	22	22 x 50	7	36 x 50	4
12 x 15	40	15 x 24	20	24 x 24	11	36 x 58	4
12 x 16	38	15 x 30	16	24 x 30	10	36 x 60	3
12 x 17	35	15 x 32	15	24 x 32	10	36 x 64	3
12 x 18	33	16 x 18	25	24 x 36	9	40 x 60	3

## CARPENTERS' WORK AND MEASURING.

What is called *Naked Flooring* in carpentry are the joists which support the flooring boards and ceiling of a room. There are different kinds, but they may all be comprised in the three following—viz.: single joisted floors, double floors, and framed floors.

A single joisted floor consists of only one series of joists; sometimes every third or fourth joist is made deeper, with ceiling joists nailed across at right angles. This is a good method, as ceilings stand better than when the laths are nailed to the joists alone.

A double floor consists of binding, bridging, and ceiling joists; the binding joists are the chief support of the floor, and the bridging joists are nailed upon the upper side of them; the ceiling joists are either notched to the under side or framed between

## CARPENTERS' WORK AND MEASURING.

with chased mortises. The best method is to notch them.

Framed floors differ from double floors only in having the binding joists framed into large pieces of timber called *girders*.

Single joisted floors, when the bearing exceeds ten feet, should be cross-bridged between the joists to prevent them from turning or twisting sideways, and also to stiffen the floor; when the bearing exceeds fifteen feet, two rows will be necessary, and so on, adding another row for each five feet bearing.

Single joisting may be used to any extent for which timber can be got deep enough; but where it is desirable to have a perfect ceiling, the bearing should not exceed 18 ft., nor the distance from center to center be more than 16 inches; otherwise the bearing for the laths become too long to produce good work.

To find the depth of a joist, the length of bearing and the thickness being given—

**RULE.**—Divide the square of the length in feet by the thickness in inches, and the cube root of the quotient, multiplied by 2.2 for pine, or 2.3 for oak, will be the depth in inches.

*Example.*—Suppose a joist whose bearing is 10 feet, and the thickness two inches, what will be the depth?

Here  $10 \times 10 = 100$ , divided by 2, the thickness  $= 50$ , the cube root of which is  $3.684 \times 2.2 = 8.1048$  equals 8 inches, the depth.

To find the scantlings of joists for different bearings from 5 to 20 feet, at several thicknesses, refer to the table on following page.

Girders are the chief support of a framed floor, and their depth is often limited by the size of the timber; therefore the method of finding the scantling may be divided in two cases—

**CASE 1.**—To find the depth of a girder when the length of bearing and thickness of girder are given.

**Rule.**—Divide the square of the length in feet by the thickness in inches, and the cube root of the quotient, multiplied by 4.2 for pine, or 4.34 for oak, will give the depth required in inches.

**CASE 2.**—To find the thickness when the length of bearing and depth are given.

**Rule.**—Divide the square of the length in feet by the cube of the depth in inches, and the quotient multiplied by 74 for pine, or by 82 for oak, will give the thickness in inches.

In these rules the girders are supposed to be ten feet apart, and this distance should never be exceeded, but should the distance apart be more or less than 10 feet, the thickness should be made proportionate thereto.

**CARPENTERS' WORK AND MEASURING.**

Length of bearing in Feet.	Depth in inches.	Thickness 2 inches.	Depth in inches.	Thickness 2½ inches.	Depth in inches.	Thickness 3 inches.	Depth in inches.	Thickness 3½ inches.	Depth in inches.	Thickness 4 inches.
5	5½		4¾		4¾		4½		4	
6	5¾		5¾		5½		4¾		4½	
7	6½		6		5½		5½		5	
8	7		6½		6¼		5¾		5¾	
9	7½		6¾		6½		6		5¾	
10	8		7½		7		6¾		6½	
11	8¾		8		7½		7		6¾	
12	9½		8½		8		7½		7¼	
13	9¾		9		8½		8		7¾	
14	10		9½		9		8½		8	
15	10½		9¾		9¼		8¾		8½	
16	11		10½		9¾		9¼		8¾	
17	11½		10¾		10¼		9¾		9¼	
18	12		11¼		10½		10		9½	
19	12½		11½		10¾		10¼		10	
20	13		12		11¼		10¾		10¼	

When the breadth of girders is considerable it is an excellent method to saw them down the middle and bolt them together, with the sawn sides outward.

Partitions unsupported from underneath the floors should be supported from the walls by means of a simple truss. This can be made by setting two pieces of scantling into the walls on either side at the floor to abut against each other at the ceiling or against a collar-beam over the doors. This plan will obviate the sinking of floors so often seen under partitions.

### Weight of Lumber, Etc., Dry.

FLOORING—Dressed and matched, per 1,000 ft.	1,800 lbs.
SIDING—Dressed per 1,000 ft.	800 "
CEILING— $\frac{3}{8}$ inch thick, per 1,000 ft.	800 "
" " $\frac{1}{2}$ " " " "	900 "
BOARDS—Dressed one side, per 1,000 ft.	2,100 "
" and dimensions, rough, per 1,000 ft.	2,500 "
SHINGLES—per 1,000	250 "
LATH—per 1,000 pieces	500 "
PICKETS—Dressed, per 1,000 pieces	1,800 "
" Rough, per 1,000 pieces	2,500 "

## WEAR AND TEAR OF BUILDING MATERIALS.

The figures given below are averages deduced from replies made by eighty-three competent builders in twenty-seven cities and towns of Western States:

MATERIAL IN BUILDINGS.	Frame Dwellings.		Brick Dwellings. (Shingle roof)		Frame Stores.		Brick Stores. (Shingle roof)	
	Average Life, years.	Percentage of Depreciation per Annum.	Average Life, years.	Percentage of Depreciation per Annum.	Average Life, years.	Percentage of Depreciation per Annum.	Average Life, years.	Percentage of Depreciation per Annum.
Brick.....	..	..	75	$1\frac{1}{8}$	..	..	66	$1\frac{1}{2}$
Plastering.....	20	5	30	$3\frac{1}{3}$	16	6	30	$3\frac{1}{3}$
Painting, outside....	5	20	7	14	5	20	6	16
Painting, inside....	7	14	7	14	5	20	6	16
Shingles..	16	6	16	6	16	6	16	6
Cornice .....	40	$2\frac{1}{2}$	40	$2\frac{1}{2}$	30	$3\frac{1}{3}$	40	$2\frac{1}{2}$
Weather boarding ..	30	$3\frac{1}{3}$	..	..	30	$3\frac{1}{3}$	..	..
Sheathing .....	50	2	50	2	40	$2\frac{1}{2}$	50	2
Flooring .....	20	5	20	5	13	8	13	8
Doors, complete...	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$	25	4	30	$3\frac{1}{3}$
Windows, complete..	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$	25	4	30	$3\frac{1}{3}$
Stairs and newel....	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$	20	5	20	5
Base .....	40	$2\frac{1}{2}$	40	$2\frac{1}{2}$	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$
Inside blinds.....	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$	30	$3\frac{1}{3}$
Building hardware..	20	5	20	5	13	8	13	8
Piazzas and porches..	20	5	20	5	20	5	20	5
Outside blinds	16	6	16	6	16	6	16	6
Sills and first floor joints .....	25	4	40	$2\frac{1}{2}$	25	4	30	$3\frac{1}{3}$
Dimension lumber..	50	2	75	$1\frac{1}{3}$	40	$2\frac{1}{2}$	66	$1\frac{1}{2}$

IN Java the "Valley of the Upas Tree" is sometimes called the "Valley of Death," and its deadly influence was formerly ascribed to the malignant properties of a peculiar vegetable production of the island, called the "upas tree," which especially flourishes in this locality. Recent travelers, however, declare that accounts of the fatality attending a passage of this famous valley have been greatly exaggerated.

A MAN may fish with the worm that hath eat of a king, and eat of the fish that hath fed of that worm.—*Shakespeare.*

## Sizes of Chairs and Desks for Schools.

Desks for Single Scholar, 2 ft. long; For Two Scholars, 3 ft. 10 in.

Age of Scholar.	Height of Chair.	Height of Desk (next scholar).	Space Occupied by Desk and Chair.
16 to 18 years.	16 $\frac{3}{4}$ inches.	29 $\frac{1}{8}$ inches.	2 feet 9 inches.
14 to 16 "	15 $\frac{1}{2}$ "	28 "	2 " 9 "
12 to 14 "	15 $\frac{1}{2}$ "	27 $\frac{1}{2}$ "	2 " 8 "
10 to 12 "	14 $\frac{1}{4}$ "	26 $\frac{1}{2}$ "	2 " 7 "
8 to 10 "	13 $\frac{1}{4}$ "	25 $\frac{1}{2}$ "	2 " 5 "
7 to 8 "	12 $\frac{1}{4}$ "	24 "	2 " 4 "
6 to 7 "	11 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "	2 " 3 "
5 to 6 "	10 $\frac{1}{2}$ "	21 "	2 " 2 "
4 to 5 "	9 $\frac{1}{2}$ "	19 "	2 " 0 "

## WEIGHT OF FLOORS, AND THE LOAD UPON SAME.

The dead weight of a fire-proof floor will average for the arches, concrete, plastering and flooring, 70 lbs. per sq. foot. The live weight, equal to a dense crowd of people, 80 lbs. per sq. foot, or a total for an office building of 150 lbs. per sq. foot.

The following loads are exclusive of weight of arches and beams:

Dense crowd of people	80 lbs.	per	sq.	foot
For floors of houses	50 "	"	"	"
Theaters and churches	80 "	"	"	"
Ball rooms	90 "	"	"	"
Ware houses	250 "	"	"	"
Factories	200 to 450 "	"	"	"
Snow 30 inches deep	15 "	"	"	"
Brick walls	112 "	"	cubic	"
Stone (Chicago lime stone, dressed)	160 "	"	"	"

The dead weight of a wooden floor, including wood joists:

Double flooring and plastering will average	25 lbs.	per	sq.	foot
If deafened	35 "	"	"	"
Stud partition of wood plastered each side	20 "	"	"	"

In estimating the weight of a flat ceiling and roof it will be safe to assume the following:

Ceiling of wooden construction	15 lbs	per	sq.	foot.
Ceiling of iron construction	25 to 65 "	"	"	"
Roof of wooden construction	45 "	"	"	"
Roof of iron construction	65 to 100 "	"	"	"

The weight of roof includes the wind pressure and snow.

**STRENGTH OF PIERS.**—Granite will sustain 40 tons per sq. ft.; Berea (sand stone), 30 tons per sq. ft.; limestone (magnesium), 29 tons per sq. ft.; Portland (sand stone), 13 tons per sq. ft.; brick in cement, 3 tons per sq. ft.; rubble masonry, 2 tons per sq. ft.; lime, cement foundation, 2 $\frac{1}{2}$  tons per sq. ft.

## WEIGHT OF VARIOUS MATERIALS.

**WEIGHT OF STONES.**—Granite, (averages) per cubic foot, 170 lbs.; limestone (magnesium), 144 lbs.; Berea (sand stone), 140 lbs.; free stone, 140 lbs.; gypsum, natural state, 140 lbs.

One ton of vein marble is 13 cubic feet; of statuary marble,  $13\frac{1}{2}$ ; granite,  $13\frac{1}{2}$ ; of Berea stone,  $14\frac{1}{3}$ ; of limestone, magnesium,  $13\frac{3}{4}$ .

**WEIGHT OF MASONRY.**—Granite, per cubic foot, 160 lbs.; of Berea stone range, 140; of limestone rubble, 140; of brick, dry, 115; of brick, dry (press), 130; of brick, dry (fire), 150; of brick masonry in mortar, 110; of brick masonry cement, 112.

**WEIGHT OF MARBLE SLABS.**—One-half inch thick, per sq. foot, 7.17 lbs.;  $\frac{3}{4}$  inch thick, 10.75; 1 inch thick, 14.32;  $1\frac{1}{4}$  inch thick, 17.92;  $1\frac{1}{2}$  inch thick, 21.05;  $1\frac{3}{4}$  inch thick, 25.08; 2 inch thick, 28.67;  $2\frac{1}{2}$  inch thick, 35.83.

**CEMENT AND LIME.**—One bushel of Portland cement weighs 96 lbs.; of Rosendale, 70; of Louisville, 62; of quick lime well shaken, 80; of quick lime, loose, 70.

**IRON AND WOOD.**—One cubic foot of wrought iron weighs 480 lbs.; of cast iron, 450; of oak (seasoned), 48; of pine (seasoned), 36.

**COAL.**—One bushel of Anthracite weighs 86 lbs.; of Bituminous, 80; of coke (Connellsville), 40; of charcoal (hardwood) 30.

**MISCELLANEOUS WEIGHTS.**—Per cubic foot: Ordinary quick lime, 53 lbs.; old mortar, 90; new mortar, well tempered, 115; new mortar, 110; river sand (average), 107; river sand (screened), 95; clay with gravel, 130; earth—vegetable, 90; earth—loamy, 100; earth—semi fluid, 110.

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SAN MARINO, in Italy, on the coast of the Adriatic Sea, is the oldest Republic in the world. It is, next to Monaco, the smallest State in Europe. The exact date of the establishment of this Republic is not known, but according to tradition, it was in the fourth century, by Marinus, a Dalmatian hermit, and has ever since remained independent. It is mountainous, and contains four or five villages. The word "LIBERTY" is inscribed on its capitol.

Is LIFE so dear, or peace so sweet, as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take; but as for me, give me liberty or give me death!—*Patrick Henry*.

THE law is a sort of hocus-pocus science, that smiles in yer face while it picks yer pocket; and the glorious uncertainty of it is of mair use to the professors than the justice of it.—*Macklin*.

KNOWLEDGE is of two kinds: we know a subject ourselves or we know where we can find information upon it.—*Johnson*.

# Crushing and Tensile Strength, in Lbs., per Sq. Inch of Natural and Artificial Stones.

DESCRIPTION.	Weight per Cubic ft. in lbs.	Crushing Force. Lbs. per Square Inch.
Aberdeen Blue Granite.....	164	8,400 to 10,914
Quincy Granite.....	166	15,300
Freestone, Belleville.....		3,522
Freestone, Caen.....		1,088
Freestone, Connecticut.....		3,319
Sandstone, Acquia Creek, used for Cap- itol, Washington.....		5,340
Limestone, Magnesian, Grafton, Ill.....		17,000
Marble, Hastings, N. Y.....		18,941
Marble, Italian.....		12,624
Marble, Stockbridge, City Hall, N. Y.....		10,382
Marble, Statuary.....		3,216
Marble, Veined.....	165	9,681
Slate.....		9,300
Brick, Red.....	135.5	808
Brick, Pale Red.....	130.3	562
Brick, Common.....		800 to 4,000
Brick, Machine Pressed.....		6,222 to 14,216
Brick, Stock.....		2,177
Brick-work, set in Cement, bricks not very hard.....		521
Brick Masonry, Common.....		500 to 800
Cement, Portland.....		1,000 to 8,300
Cement, Portland, Cement 1, Sand 1.....		1,280
Cement, Roman.....		342
Mortar.....		120 to 240
Crown Glass.....		31,000
		TENSION.
Portland Cement.....		427 to 711
Portland Cement, with Sand.....		92 to 284
Glass, Plate.....		9,420
Mortar.....		50
Plaster of Paris.....		72
Slate.....		11,000

ERROR of opinion may be tolerated where reason is left free to combat it.—*Thomas Jefferson.*

VIRTUE is like precious odors, most fragrant when they are incensed or crushed.—*Lord Bacon.*



# WEIGHT OF CAST IRON COLUMNS. PER LINEAL FOOT OF PLAIN SHAFT.

Diam.	THICKNESS OF METAL.											
	$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{3}{4}$ in.	$\frac{7}{8}$ in.	1 in.	$1\frac{1}{8}$ in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	$1\frac{3}{4}$ in.	2 in.
2	4.3	6.0	7.4	8.4	9.2	9.7	9.8	.....	.....	.....	.....	.....
$2\frac{1}{2}$	5.5	7.8	9.8	11.5	12.9	14.0	14.7	.....	.....	.....	.....	.....
3	6.8	9.7	12.3	14.6	16.6	18.3	19.6	.....	.....	.....	.....	.....
$3\frac{1}{2}$	8.0	11.5	14.7	17.6	20.3	22.6	24.6	.....	.....	.....	.....	.....
4	9.2	13.3	17.2	20.7	23.9	26.8	29.5	.....	.....	.....	.....	.....
$4\frac{1}{2}$	10.4	15.2	19.6	23.8	27.6	31.1	34.4	37.3	39.9	.....	.....	.....
5	11.7	17.0	22.1	26.9	31.3	35.4	39.3	42.8	46.0	.....	.....	.....
$5\frac{1}{2}$	12.9	18.9	24.5	29.9	35.0	39.7	44.2	48.3	52.2	.....	.....	.....
6	14.1	20.7	27.8	33.0	38.7	44.0	49.1	53.9	58.3	.....	.....	.....
$6\frac{1}{2}$	15.3	22.6	29.5	36.1	42.3	48.3	54.0	59.4	64.4	.....	.....	.....
7	16.6	24.4	31.9	39.1	46.0	52.0	58.9	64.9	70.6	81.0	.....	.....
$7\frac{1}{2}$	17.8	26.2	34.4	42.2	49.7	56.9	63.8	70.4	76.7	88.4	.....	.....
8	19.0	28.1	36.8	45.3	53.4	61.2	68.7	75.9	82.8	95.7	.....	.....
$8\frac{1}{2}$	20.2	29.9	39.3	48.3	57.1	65.5	73.6	81.5	89.0	103.1	.....	.....
9	21.5	31.8	41.7	51.4	60.8	69.8	78.5	87.0	95.1	110.5	.....	.....
$9\frac{1}{2}$	22.7	33.6	44.2	54.5	64.4	74.1	83.5	92.5	101.2	117.8	133.2	.....
10	23.9	35.4	46.6	57.5	68.1	78.4	88.4	98.0	107.4	125.2	141.7	157.1
$10\frac{1}{2}$	25.2	37.3	49.1	60.6	71.8	82.7	93.3	103.5	113.5	132.5	150.3	166.9
11	26.4	39.1	51.6	63.7	75.5	87.0	98.2	109.1	119.7	139.9	158.9	176.7
$11\frac{1}{2}$	27.6	41.0	54.8	66.7	79.2	91.3	103.1	114.6	125.8	147.3	167.5	186.5
12	28.8	42.8	56.5	69.8	82.8	95.6	108.0	120.1	131.9	154.6	176.1	196.3
$12\frac{1}{2}$	.....	44.6	58.9	72.9	86.5	99.9	112.9	125.6	138.1	162.0	184.7	206.2
13	.....	46.5	61.4	75.9	90.2	104.2	117.8	131.2	144.2	169.4	193.3	216.0
$13\frac{1}{2}$	.....	.....	63.8	79.0	93.9	108.5	122.7	136.7	150.3	176.7	201.9	225.8
14	.....	.....	66.3	82.1	97.6	112.8	127.6	142.2	156.5	184.1	210.5	235.6
$14\frac{1}{2}$	.....	.....	68.7	85.2	101.2	117.0	132.5	147.7	162.6	191.4	219.1	245.4
15	.....	.....	71.2	88.2	104.9	121.3	137.5	153.2	168.7	198.8	227.6	255.2
16	.....	.....	76.1	94.3	112.3	129.9	147.3	164.3	181.0	213.5	244.8	274.9
17	.....	.....	81.0	100.5	119.7	138.5	157.1	175.3	193.3	228.3	262.0	294.5
18	.....	.....	85.9	106.6	127.0	147.1	166.9	186.4	205.6	243.0	279.2	314.1
19	.....	.....	90.8	112.8	134.4	155.7	176.7	197.4	217.8	257.7	296.4	333.8
20	.....	.....	95.7	118.9	141.7	164.3	186.5	208.5	230.1	274.4	313.5	353.4

## INCREASE IN WEIGHT FOR 1-2 IN. INCREASE IN DIAMETER.

$\frac{1}{4}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{3}{4}$ in.	$\frac{7}{8}$ in.	1 in.	$1\frac{1}{8}$ in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	$1\frac{3}{4}$ in.	2 in.
1.2	1.8	2.5	3.1	3.7	4.3	4.9	5.5	6.1	7.4	8.6	9.8

# WEIGHT OF CAST IRON BALLS.

Diameter, Inches.	Weight, Lbs.	Diameter, Inches.	Weight, Lbs.	Diameter, Inches.	Weight, Lbs.
2	1.09	5	17.04	8	69.81
2½	2.13	5½	22.68	8½	83.73
3	3.68	6	29.45	9	99.40
3½	5.84	6½	37.44	10	136.35
4	8.73	7	46.76	11	181.48
4½	12.42	7½	57.52	12	235.65

TO FIND THE WEIGHT OF CAST IRON BALLS WHEN THE DIAMETER IS GIVEN—*Rule*: Multiply the cube of the diameter by .1377.

TO FIND THE DIAMETER OF CAST IRON BALLS WHEN THE WEIGHT IS GIVEN—*Rule*: Multiply the cube root of the weight by 1.936.

TO FIND THE WEIGHT OF A SPHERICAL SHELL—From the weight of a ball of the outer diameter subtract the weight of one of the inner diameter.

## CAST IRON—ASSUMED WEIGHT IN ESTIMATING

A cubic foot . . . . . = 450 lbs.  
A square foot, 1 inch thick . . . . . = 38 "  
A bar 1 inch square and 1 foot long . . . . . = 3.125 "

## TABLE OF WEIGHT PER LINEAL FOOT OF ROUND CAST IRON.

Diameter, Inches.	Weight, Lbs.	Diameter, Inches.	Weight, Lbs.	Diameter, Inches.	Weight, Lbs.
1	2.45	5	61.36	9	198.80
1¼	3.84	5¼	67.65	9½	221.51
1½	5.52	5½	74.25	10	245.44
1¾	7.52	5¾	81.15	10½	270.60
2	9.82	6	88.36	11	296.98
2¼	12.43	6¼	95.87	11½	324.59
2½	15.34	6½	103.70	12	353.43
2¾	18.56	6¾	111.83	13	414.79
3	22.09	7	120.26	14	481.06
3¼	25.92	7¼	129.01	15	552.23
3½	30.07	7½	138.06	16	628.32
3¾	34.52	7¾	147.42	17	709.31
4	39.27	8	157.08	18	795.22
4¼	44.33	8¼	167.05	20	981.75
4½	49.70	8½	177.33	22	1187.92
4¾	55.38	8¾	187.91	24	1413.72

## Rules for Obtaining Approximate Weight of Cast Iron.

Square of diameter multiplied by 2.46 equals weight of cast iron round bar 1 foot long.

To ascertain weight of cast iron columns or pipe subtract weight of inside diameter of shell from weight of outside diameter.

Square of the diameter divided by 5 equals approximately the weight of a circular cast iron plate 1 inch thick.

## Rules for Obtaining Approximate Weight of Wrought Iron.

**FOR ROUND BARS—Rule:** Multiply the square of the diameter in inches by the length in feet, and that product by 2.6. The product will be the weight in pounds, nearly.

**FOR SQUARE AND FLAT WROUGHT BARS—Rule:** Multiply the area of the end of the bar in inches by the length in feet, and that by 3.32. The product will be the weight in pounds, nearly.

To find the sectional area of a bar of wrought iron, given the weight per foot, multiply by 3 and divide by 10.

To find the weight per foot, given the area, divide by 3 and multiply by 10.

## To Convert Weight of

Wrought Iron into Cast Iron	. . . . .	× 0.928
“ “ “ Steel	. . . . .	× 1.014
“ “ “ Zinc	. . . . .	× 0.918
“ “ “ Brass	. . . . .	× 1.082
“ “ “ Copper	. . . . .	× 1.144
“ “ “ Lead	. . . . .	× 1.468
Square Iron into Round	. . . . .	× .7854

## Decimal Approximations Useful in Calculations,

Cubic inches,	×	.267	= lbs. average cast iron.
“ “	×	.281	= “ “ wrought iron.
“ “	×	.283	= “ “ cast steel.
“ “	×	.3225	= “ “ copper.
“ “	×	.3037	= “ “ brass.
“ “	×	.26	= “ “ zinc.
“ “	×	.4103	= “ “ lead.
“ “	×	.2636	= “ “ tin.
“ “	×	.4908	= “ “ mercury.
Cylin. “	×	.2065	= “ “ cast iron.
“ “	×	.2168	= “ “ wrought iron.
“ “	×	.2223	= “ “ cast steel.
“ “	×	.2533	= “ “ copper.
“ “	×	.2385	= “ “ brass.
“ “	×	.2042	= “ “ zinc.
“ “	×	.3223	= “ “ lead.
“ “	×	.207	= “ “ tin.
“ “	×	.3854	= “ “ mercury.

# Weight of a Lineal Foot of Flat Bar Iron, in Lbs.

BIRMINGHAM GAUGE.

BREADTH IN INCHES.	THICKNESS IN FRACTIONS OF INCHES.								
	$\frac{1}{4}$	5-16	$\frac{3}{8}$	7-16	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
1	.83	1.04	1.25	1.46	1.67	2.08	2.50	2.92	3.34
$1\frac{1}{8}$	.93	1.17	1.40	1.64	1.87	2.34	2.81	3.28	3.75
$1\frac{1}{4}$	1.04	1.30	1.56	1.82	2.08	2.60	3.13	3.65	4.17
$1\frac{3}{8}$	1.14	1.43	1.72	2.00	2.29	2.87	3.44	4.01	4.59
$1\frac{1}{2}$	1.25	1.56	1.87	2.19	2.50	3.13	3.75	4.38	5.00
$1\frac{5}{8}$	1.35	1.69	2.03	2.37	2.71	3.39	4.07	4.70	5.43
$1\frac{3}{4}$	1.46	1.82	2.19	2.55	2.92	3.65	4.38	5.11	5.84
$1\frac{7}{8}$	1.56	1.95	2.34	2.74	3.13	3.91	4.69	5.47	6.26
2	1.67	2.08	2.50	2.92	3.34	4.17	5.01	5.86	6.68
$2\frac{1}{8}$	1.77	2.21	2.66	3.10	3.55	4.43	5.32	6.21	7.10
$2\frac{1}{4}$	1.87	2.34	2.81	3.28	3.76	4.69	5.63	6.57	7.52
$2\frac{3}{8}$	1.93	2.47	2.97	3.47	3.96	4.95	5.95	6.94	7.93
$2\frac{1}{2}$	2.08	2.60	3.13	3.65	4.17	5.21	6.26	7.30	8.35
$2\frac{5}{8}$	2.19	2.74	3.28	3.83	4.38	5.47	6.57	7.67	8.77
$2\frac{3}{4}$	2.29	2.87	3.44	4.01	4.59	5.74	6.88	8.03	9.18
$2\frac{7}{8}$	2.40	3.00	3.60	4.20	4.80	6.00	7.20	8.40	9.60
3	2.50	3.13	3.75	4.38	5.01	6.26	7.51	8.76	10.02
$3\frac{1}{4}$	2.71	3.39	4.07	4.74	5.43	6.78	8.14	9.49	10.86
$3\frac{1}{2}$	2.92	3.65	4.38	5.11	5.84	7.30	8.76	10.23	11.69
$3\frac{3}{4}$	3.13	3.91	4.68	5.47	6.26	7.82	9.39	10.95	12.52
4	3.34	4.17	5.00	5.84	6.68	8.35	10.02	11.69	13.36
$4\frac{1}{4}$	3.54	4.43	5.32	6.21	7.09	8.87	10.64	12.42	14.19
$4\frac{1}{2}$	3.75	4.69	5.63	6.57	7.51	9.39	11.27	13.15	15.03
$4\frac{3}{4}$	4.06	4.95	5.94	6.94	7.93	9.91	11.89	13.83	15.86
5	4.17	5.21	6.26	7.30	8.35	10.44	12.52	14.61	16.70
$5\frac{1}{4}$	4.38	5.47	6.57	7.67	8.76	11.06	13.14	15.34	17.53
$5\frac{1}{2}$	4.59	5.73	6.88	8.03	9.18	11.48	13.77	16.07	18.37
$5\frac{3}{4}$	4.80	6.00	7.20	8.40	9.60	12.00	14.40	16.80	19.20
6	5.01	6.25	7.51	8.76	10.02	12.53	15.03	17.53	20.06

## Wrought Iron, Assumed Weight.

A cubic foot	.	.	.	.	.	.	.	.	.	= 480 lbs.
A square foot, 1 inch thick	.	.	.	.	.	.	.	.	.	= 40 "
A bar 1 inch square, 1 foot long	.	.	.	.	.	.	.	.	.	= $31\frac{1}{3}$ "
A " 1 " " 1 yard long	.	.	.	.	.	.	.	.	.	= 10 "

## GAUGES AND THEIR EQUIVALENTS.

No. 27, equal to $\frac{1}{8}$ inch.	No. 12, equal to $\frac{7}{8}$ inch.
" 21, " " $\frac{3}{4}$ "	" 10, " " $\frac{1}{2}$ "
" 18, " " $\frac{5}{8}$ "	" 8, " " $\frac{3}{4}$ "
" 16, " " $\frac{1}{2}$ "	" 6, " " $\frac{5}{8}$ "
" 14, " " $\frac{3}{8}$ "	" 5, " " $\frac{3}{4}$ "
" 13, " " $\frac{1}{2}$ "	" 4, " " $\frac{1}{4}$ "

TRUTH is as impossible to be soiled by any outward touch as the sunbeam.—*Lord Bacon.*

# AMERICAN AND BIRMINGHAM WIRE GAUGES. THICKNESS IN INCHES.

Haswell.

Gauge.	Thickness American Gauge.	Thickness Birmingham Gauge.	Gauge.	Thickness American Gauge.	Thickness Birmingham Gauge.
0000	.46	.454	17	.0452	.058
000	.4096	.425	18	.0403	.049
00	.3648	.38	19	.0359	.042
0	.3248	.34	20	.0319	.035
1	.2893	.30	21	.0284	.032
2	.2576	.284	22	.0253	.028
3	.2294	.259	23	.0225	.025
4	.2043	.238	24	.0201	.022
5	.1819	.22	25	.0179	.02
6	.1620	.203	26	.0160	.018
7	.1443	.18	27	.0142	.016
8	.1285	.165	28	.0126	.014
9	.1144	.148	29	.0112	.013
10	.1019	.134	30	.01	.012
11	.0907	.12	31	.0089	.01
12	.0808	.109	32	.0079	.009
13	.0719	.095	33	.007	.008
14	.0641	.083	34	.0063	.007
15	.057	.072	35	.0056	.005
16	.0508	.065	36	.005	.004

## The Area of a Circle.

Of all plane figures, the circle is the most capacious, or has the greatest area within the same limits. It is geometrically demonstrable that it has the same area as a right-angled triangle with a base equal to its circumference, and a perpendicular equal to its radius, that is, half the product of the radius and circumference. It is obviously larger than any figure, of however many sides, inscribed within its perimeter, and smaller than any circumscribed polygon. As a result of laborious calculations on this basis (pushed in one instance to 600 places of decimals without reaching the end), it has been ascertained that the ratio of the diameter to the circumference of any circle (sufficient) exact for all practical purposes, is as 1 : 3.1416 (3.141592653+) or in whole numbers, approximately, as 7 : 22, or more nearly as 113 : 355. Hence, to find the circumference or diameter, the other quantity being known, multiply or divide by 3.1416; and to find the area, multiply half the diameter by half the circumference, or the square of the diameter by .7854 (3.1416÷4).

TO FIND THE SURFACE OF A GLOBE, multiply the square of the diameter by 3.1416.

TO FIND THE SOLIDITY OF A GLOBE, multiply the cube of the diameter by .5236.

# AREAS OF CIRCLES,

Advancing by eighths.

Diam.	AREAS.							
	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0	.0	.0122	.0490	.1104	.1963	.3068	.4417	.6013
1	.7854	.9940	1.227	1.484	1.767	2.073	2.405	2.761
2	3.1416	3.546	3.976	4.430	4.908	5.411	5.939	64.91
3	7.068	7.669	8.295	8.946	9.621	10.32	11.04	11.79
4	12.56	13.36	14.18	15.03	15.90	16.80	17.72	18.66
5	19.63	20.62	21.64	22.69	23.75	24.85	25.96	27.10
6	28.27	29.46	30.67	31.91	33.18	34.47	35.78	37.12
7	38.48	39.87	41.28	42.71	44.17	45.66	47.17	48.70
8	50.26	51.84	53.45	55.08	56.74	58.42	60.13	61.86
9	63.61	65.39	67.20	69.02	70.88	72.75	74.69	76.58
10	78.54	80.51	82.51	84.54	86.59	88.66	90.76	92.88
11	95.03	97.20	99.40	101.6	103.8	106.1	108.4	110.7
12	113.0	115.4	117.8	120.2	122.7	125.1	127.6	130.1
13	132.7	135.2	137.8	140.5	143.1	145.8	148.4	151.2
14	153.9	156.6	159.4	162.2	165.1	167.9	170.8	173.7
15	176.7	179.6	182.6	185.6	188.6	191.7	194.8	197.9
16	201.0	204.2	207.3	210.5	213.8	217.0	220.3	223.6
17	226.9	230.3	233.7	237.1	240.5	243.9	247.4	250.9
18	254.4	258.0	261.5	265.1	268.8	272.4	276.1	279.8
19	283.5	287.2	291.0	294.8	298.8	302.4	306.3	310.2
20	314.1	318.1	322.0	326.0	330.0	334.1	338.1	342.2
21	346.3	350.4	354.6	358.8	363.0	367.2	371.5	375.8
22	380.1	384.4	388.8	393.2	397.6	402.0	406.4	410.9
23	415.4	420.0	424.5	429.1	433.7	438.3	443.0	447.6
24	452.3	457.1	461.8	466.6	471.4	476.2	481.1	485.9
25	490.8	495.7	500.7	505.7	510.7	515.7	520.7	525.8
26	530.9	536.0	541.1	546.3	551.5	556.7	562.0	567.2
27	572.5	577.8	583.2	588.5	593.9	599.3	604.8	610.2
28	615.7	621.2	626.7	632.3	637.9	643.5	649.1	654.8
29	660.5	666.2	671.9	677.7	683.4	689.2	695.1	700.9
30	706.8	712.7	718.6	724.6	730.6	736.6	742.6	748.6
31	754.8	760.9	767.0	773.1	779.3	785.5	791.7	798.0
32	804.3	810.6	816.9	823.2	829.6	836.0	842.4	848.8
33	855.3	861.8	868.3	874.9	881.4	888.0	894.6	901.3
34	907.9	914.7	921.3	928.1	934.8	941.6	948.4	955.3
35	962.1	969.0	975.9	982.8	989.8	996.8	1003.8	1010.8
36	1017.9	1025.0	1032.1	1039.2	1046.3	1053.5	1060.7	1068.0
37	1075.2	1082.5	1089.8	1097.1	1104.5	1111.8	1119.2	1126.7
38	1134.1	1141.6	1149.1	1156.6	1164.2	1171.7	1179.3	1186.9
39	1194.6	1202.3	1210.0	1217.7	1225.4	1233.2	1241.0	1248.8
40	1256.6	1264.5	1272.4	1280.3	1288.2	1296.2	1304.2	1312.2
41	1320.3	1328.3	1336.4	1344.5	1352.7	1360.8	1369.0	1377.2
42	1385.4	1393.7	1402.0	1410.3	1418.6	1427.0	1435.4	1443.8
43	1452.2	1460.7	1469.1	1477.6	1486.2	1494.7	1503.3	1511.9
44	1520.5	1529.2	1537.9	1546.6	1555.3	1564.0	1572.8	1581.6
45	1590.4	1599.3	1608.2	1617.0	1626.0	1634.9	1643.9	1652.9

# CIRCUMFERENCES OF CIRCLES,

Advancing by eighths.

Diam.	CIRCUMFERENCES.							
	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0	.0	.3927	.7854	1.178	1.570	1.963	2.356	2.748
1	3.141	3.534	3.927	4.319	4.712	5.105	5.497	5.890
2	6.283	6.675	7.068	7.461	7.854	8.246	8.639	9.032
3	9.424	9.817	10.21	10.60	10.99	11.38	11.78	12.17
4	12.56	12.95	13.35	13.74	14.13	14.52	14.92	15.31
5	15.70	16.10	16.49	16.88	17.27	17.67	18.06	18.45
6	18.84	19.24	19.63	20.02	20.42	20.81	21.20	21.59
7	21.99	22.38	22.77	23.16	23.56	23.95	24.34	24.74
8	25.13	25.52	25.91	26.31	26.70	27.09	27.48	27.88
9	28.27	28.66	29.05	29.45	29.84	30.23	30.63	31.02
10	31.41	31.80	32.20	32.59	32.98	33.37	33.77	34.16
11	34.55	34.95	35.34	35.73	36.12	36.52	36.91	37.30
12	37.69	38.09	38.48	38.87	39.27	39.66	40.05	40.44
13	40.84	41.23	41.62	42.01	42.41	42.80	43.19	43.58
14	43.98	44.37	44.76	45.16	45.55	45.94	46.33	46.73
15	47.12	47.51	47.90	48.30	48.69	49.08	49.48	49.87
16	50.26	50.65	51.05	51.44	51.83	52.22	52.62	53.01
17	53.40	53.79	54.19	54.58	54.97	55.37	55.76	56.15
18	56.54	56.94	57.33	57.72	58.11	58.51	58.90	59.29
19	59.69	60.08	60.47	60.86	61.26	61.65	62.04	62.43
20	62.83	63.22	63.61	64.01	64.40	64.79	65.18	65.58
21	65.97	66.36	66.75	67.15	67.54	67.93	68.32	68.72
22	69.11	69.50	69.90	70.29	70.68	71.07	71.47	71.86
23	72.25	72.64	73.04	73.43	73.82	74.22	74.61	75.00
24	75.39	75.79	76.18	76.57	76.96	77.36	77.75	78.14
25	78.54	78.93	79.32	79.71	80.10	80.50	80.89	81.28
26	81.68	82.07	82.46	82.85	83.25	83.64	84.03	84.43
27	84.82	85.21	85.60	86.00	86.39	86.78	87.17	87.57
28	87.96	88.35	88.75	89.14	89.53	89.92	90.32	90.71
29	91.10	91.49	91.89	92.28	92.67	93.06	93.46	93.85
30	94.24	94.64	95.03	95.42	95.81	96.21	96.60	96.99
31	97.39	97.78	98.17	98.57	98.96	99.35	99.75	100.14
32	100.53	100.92	101.32	101.71	102.10	102.49	102.89	103.29
33	103.67	104.07	104.46	104.85	105.24	105.64	106.03	106.42
34	106.81	107.21	107.60	107.99	108.39	108.78	109.17	109.56
35	109.96	110.35	110.74	111.13	111.53	111.92	112.31	112.71
36	113.10	113.49	113.88	114.28	114.67	115.06	115.45	115.85
37	116.24	116.63	117.02	117.42	117.81	118.20	118.61	118.99
38	119.38	119.77	120.17	120.56	120.95	121.34	121.74	122.13
39	122.52	122.92	123.31	123.70	124.09	124.49	124.88	125.27
40	125.66	126.06	126.45	126.84	127.24	127.63	128.02	128.41
41	128.81	129.20	129.59	129.99	130.38	130.77	131.16	131.55
42	131.95	132.34	132.73	133.13	133.52	133.91	134.30	134.70
43	135.09	135.48	135.87	136.27	136.66	137.05	137.45	137.84
44	138.23	138.62	139.02	139.41	139.80	140.19	140.59	140.98
45	141.37	141.76	142.16	142.55	142.94	143.34	143.73	144.12

[illegible]

Dimensions of a common wash-stand, 2 ft. 4 in. wide, 1 ft. 6 in. deep.



## HANDY FACTS FOR ARCHITECTS, ETC.

Dimensions of a barrel—Diameter of head, 17 in.; bung, 19 in.; length, 28 in.; volume, 7,680 cubic in.

Dimensions of billiard tables (Collender)—4 ft. by 8 ft.; 4 ft. 2 in. by 9 ft.; and 5 ft. by 10 ft. Size of room required respectively, 13 by 17; 14 by 18; 15 by 20.

Horse-stalls—Width, 3 ft. 10 in. to 4 ft., or else 5 ft. or over in width—nine feet long. Width should never be between 4 and 5 ft., as in that case the horse is liable to cast himself.

### HORSE POWER OF STEAM ENGINES, ETC.

The *unit* of nominal power for steam engines, or the usual estimate of dynamical effect per minute of a horse, called by engineers a "horse power," is 33,000 pounds at a velocity of 1 foot per minute, or, the effect of a load of 200 pounds raised by a horse for 8 hours a day, at the rate of  $2\frac{1}{2}$  miles per hour, or 150 pounds at the rate of 220 feet per minute.

**RULE.**—Multiply the area of the piston in square inches by the average force of the steam in pounds and by the velocity of the piston in feet per minute; divide the product by 33,000, and  $\frac{1}{10}$  of the quotient equal the effective power.

**ANOTHER RULE.**—The diameter of the piston in inches, multiplied by itself, multiplied by the stroke in inches, multiplied by the revolutions per minute (not the strokes), multiplied by the mean effective (average pressure per square inch on piston), multiplied by .0000397, gives the gross or indicated horse power.

For the net effective horse power, deduct from the above about  $\frac{1}{4}$  for friction of the working parts.

The mean effective pressure can be accurately determined only by the aid of an indicator. When the indicator is not used, and in the calculation the boiler pressure is substituted for the mean effective pressure, deduct from the result obtained from 40 to 60 per cent. for loss by condensation and friction of steam pipes and passages, decrease of pressure in cylinder due to expansion, back pressure of exhaust, and friction of the working parts.

For engines from 20 to 60 horse power, an average of 50 per cent. may be deducted; for smaller engines, more.

The mean pressure in the cylinder when cutting off at

$\frac{1}{4}$ stroke equals boiler pressure multiplied by	.597
$\frac{1}{3}$ " " " " "	.670
$\frac{2}{8}$ " " " " "	.743
$\frac{1}{2}$ " " " " "	.847
$\frac{5}{8}$ " " " " "	.919
$\frac{2}{3}$ " " " " "	.937
$\frac{3}{4}$ " " " " "	.966
$\frac{7}{8}$ " " " " "	.992

Best designed boilers, well set, with good draft and skillful firing, will evaporate from 7 to 10 lbs. of water per pound of first-

## HORSE POWER OF STEAM ENGINES.

class coal. The average result is from 30 to 60 per cent. below this.

In calculating horse power of Tubular or Flue boilers, consider 15 square feet of heating surface equivalent to one *nominal* horse power.

One square foot of grate will consume on an average 12 lbs of coal per hour.

Steam engines, in economy, vary from 30 to 60 lbs. of feed water and from 2 to 7 lbs. of coal per hour per indicated H. P.

### HORSE POWER OF BELTING.

A simple rule for ascertaining transmitting power of belting without first computing speed per minute that it travels, is as follows: Multiply diameter of pulley in inches by its number of revolutions per minute, and this product by width of the belt in inches; divide the product by 3,300 for single belting, or by 2,100 for double belting, and the quotient will be the amount of horse power that can be safely transmitted.

#### Table for Single Leather, Four Ply Rubber and Four Ply Cotton Belting, Belts not Overloaded.

1 INCH WIDE, 800 FEET PER MINUTE=1 HORSE POWER.

Speed in Ft per Min.	WIDTH OF BELTS IN INCHES.											
	2	3	4	5	6	8	10	12	14	16	18	20
	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.
400	1	1½	2	2½	3	4	5	6	7	8	9	10
600	1½	2½	3	3½	4½	6	7½	9	10½	12	13½	15
800	2½	3	4	5	6	8	10	12	14	16	18	20
1000	2	3½	5	6½	7½	10	12½	15	17½	20	22½	25
1200	3	4½	6	7½	9	12	15	18	21	24	27	30
1500	3½	5½	7½	9½	11½	15	18½	22½	26½	30	33½	37½
1800	4½	6½	9	11½	13½	18	22½	27	31½	36	40½	45
2000	5	7½	10	12½	15	20	25	30	35	40	45	50
2400	6	9	12	15	18	24	30	36	42	48	54	60
2800	7	10½	14	17½	21	28	35	42	49	56	63	70
3000	7½	11½	15	18½	22½	30	37½	45	52½	60	67½	75
3500	8½	13	17½	22	26	35	44	52½	61	70	79	88
4000	10	15	20	25	30	40	50	60	70	80	90	100
4500	11½	17	22½	28	34	45	57	69	78	90	102	114
5000	12½	19	25	31	37½	50	62½	75	87½	100	112	125

Double leather, six-ply rubber or six-ply cotton belting will transmit 50 to 75 per cent. more power than is shown in this table. (One inch wide, 550 feet per minute=one horse power.)

**Table of Transmission of Power by Wire Ropes.**

Diameter of Wheel in Ft.	Number of Revolutions.	Trade No. of Rope.	Diameter of Rope.	Horse Power.	Diameter of Wheel in Ft.	Number of Revolutions	Trade No. of Rope.	Diameter of Rope.	Horse Power.
4	80	23	$\frac{3}{8}$	3.3	10	80	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{55 0 58 4
4	100	23	$\frac{3}{8}$	4.1	10	100	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{68 7 73 0
4	120	23	$\frac{3}{8}$	5.0	10	120	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{82.5 87 6
4	140	23	$\frac{3}{8}$	5.8	10	140	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{96 2 102 2
5	80	22	$\frac{7}{16}$	6.9	10	140	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{64 9 75 5
5	100	22	$\frac{7}{16}$	8.6	11	80	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{81 1 94 4
5	120	22	$\frac{7}{16}$	10.3	11	100	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{97 3 113 3
5	140	22	$\frac{7}{16}$	12.1	11	120	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{113.6 132 1
6	80	21	$\frac{1}{2}$	10.7	11	140	{19 18	$\frac{5}{8}$ $1\frac{1}{8}$	{93 4 99.3
6	100	21	$\frac{1}{2}$	13.4	11	80	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{116 7 124.1
6	120	21	$\frac{1}{2}$	16.1	12	100	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{140 1 148 9
6	140	21	$\frac{1}{2}$	18.7	12	120	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{163.5 173.7
7	80	20	$\frac{9}{16}$	16.9	12	140	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{112 0 122.6
7	100	20	$\frac{9}{16}$	21.1	13	80	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{140 0 153 2
7	120	20	$\frac{9}{16}$	25.3	13	100	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{168.0 183 9
7	140	20	$\frac{9}{16}$	29.6	13	120	{18 17	$1\frac{1}{8}$ $\frac{3}{4}$	{148 0 141 0
8	80	19	$\frac{5}{8}$	22.0	14	80	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{185.0 176 0
8	100	19	$\frac{5}{8}$	27.5	14	100	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{222 0 211 0
8	120	19	$\frac{5}{8}$	33.0	14	120	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{217.0 259 0
8	140	19	$\frac{5}{8}$	38.5	15	80	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{259 0 300 0
9	80	{20 19	$\frac{9}{16}$ $\frac{5}{8}$	{40.0 41.5	15	100	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{300 0 300.0
9	100	{20 19	$\frac{9}{16}$ $\frac{5}{8}$	{50.0 51.9	15	120	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{300 0 300.0
9	120	{20 19	$\frac{9}{16}$ $\frac{5}{8}$	{60.0 62.2	15	80	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{300 0 300.0
9	140	{20 19	$\frac{9}{16}$ $\frac{5}{8}$	{70.0 72.6	15	100	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{300 0 300.0
					15	120	{17 16	$\frac{3}{4}$ $\frac{7}{8}$	{300 0 300.0

## USEFUL HYDRAULIC INFORMATION.

A gallon of water (U. S. standard) weighs  $8\frac{1}{3}$  pounds and contains 231 cubic inches. A cubic foot of water weighs  $62\frac{1}{2}$  pounds, and contains 1,728 cubic inches or  $7\frac{1}{2}$  gallons.

Doubling the diameter of a pipe increases its capacity four times. Friction of liquids in pipes increases as the square of the velocity.

The mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches or a column of water 33.9 feet high.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434. Approximately we say that every foot elevation is equal to  $\frac{1}{2}$  pound pressure per square inch; this allows for ordinary friction.

To find the diameter of a pump cylinder to move a given quantity of water per minute (100 feet of piston being the standard of speed), divide the number of gallons by 4, then extract the square root, and the product will be the diameter in inches of the pump cylinder.

To find quantity of water elevated in one minute running at 100 feet of piston speed per minute: Square the diameter of the water cylinder in inches and multiply by 4. Example: Capacity of a 5-inch cylinder is desired. The square of the diameter (5 inches) is 25, which, multiplied by 4, gives 100, the number of gallons per minute (approximately).

To find the horse power necessary to elevate water to a given height, multiply the total weight of the water in lbs. by the height in feet and divide the product by 33,000 (an allowance of 25 per cent. should be added for water friction, and a further allowance of 25 per cent. for loss in steam cylinder).

The area of the steam piston, multiplied by the steam pressure, gives the total amount of pressure that can be exerted. The area of the water piston multiplied by the pressure of water per square inch gives the resistance. A margin must be made between the power and the resistance to move the pistons at the required speed—say from 20 to 40 per cent., according to speed and other conditions.

To find the capacity of a cylinder in gallons. Multiplying the area in inches by the length of stroke in inches, will give the total number of cubic inches; divide this amount by 231 (which is the cubical contents of a U. S. gallon in inches), and the product is the capacity in gallons.

With the efficient working of pumps certain precautions are necessary. Following are a few hints that will be of service to persons interested in the subject:

Care should be exercised to prevent foreign substances from entering the suction

## USEFUL HYDRAULIC INFORMATION.

~~pipe~~. In case of such danger a strainer should be used and the total area of the strain~~ing~~ holes should be from two to five times the area of the pipe.

It is of great advantage to have the suction pipe as straight and free as possible. Elbows and valves obstruct the flow of water much more than usually supposed.

Above all other things, the suction pipe should be perfectly air-tight, as a very small leak will supply the pump with so much air that little or no water will be obtained.

It is advantageous, and, when high speed is desired, becomes a necessity, to connect a vacuum chamber to the suction pipe near the pump.

A foot-valve should be used on long or high suction. Its area should be at least as much as the pipe.

If in an exposed position, the pump should be thoroughly drained after stopping, to prevent injury by frost, by means of the drain-cocks provided for the purpose.

When a pump is to remain idle for some time the steam cylinder should be well oiled before stopping.

The stuffing-boxes should be carefully packed so as not to necessitate them being screwed down too tight.

The most economical speed to run a pump is 100 feet per minute.

The friction of liquids in pipes increases as the square of the velocity.

To find the capacity of a Double-Acting Pump in U. S. gallons per minute, multiply together: the area of the water cylinder in inches; the length of the stroke in inches; the number of single strokes per minute. Divide the product by 231. For a Single-Acting Pump take half the number of single strokes.

For domestic use water should be kept in wooden or iron tanks. Zinc can be used to advantage. The use of lead-lined tanks is exceedingly dangerous, especially for keeping rain water.

## CAPACITY OF CYLINDRICAL CISTERNS OR TANKS

FOR EACH FOOT OF DEPTH (U. S. GALLONS).

Diameter in Feet.	Gallons.	Pounds.	Diameter in Feet.	Gallons.	Pounds.
2.0	23.5	196	9.0	475.9	3,968
2.5	36.7	306	9.5	530.2	4,421
3.0	52.9	441	10.0	587.5	4,899
3.5	72.0	600	11.0	710.9	5,923
4.0	94.0	784	12.0	846.0	7,054
4.5	119.0	992	13.0	992.9	8,250
5.0	146.9	1,225	14.0	1,151.5	9,602
5.5	177.7	1,482	15.0	1,321.9	11,023
6.0	211.5	1,764	20.0	2,350.1	19,596
6.5	248.2	2,070	25.0	3,672.0	31,620
7.0	287.9	2,401	30.0	5,287.7	44,093
7.5	330.5	2,756	35.0	7,197.1	60,016
8.0	376.0	3,135	40.0	9,400.3	78,388
8.5	424.5	3,540	....	.....	.....

THE great philosopher, Plato, defined man as a featherless biped. Thereupon the shrewd old cynic, Diogenese, plucked the feathers from a goose, and, having labeled it "Plato's man," threw it over into the philosopher's class-room.

## SIZE, CAPACITY, ETC., OF BOILERS. LOCOMOTIVES.

Length.		Diam.	Fire Box	Dome.	Flues.	Length.		Area Chimney.	Capacity.
Ft.	in.	inches.	inches.	inches.	in.	ft.	in.	sq. inches.	sq. in.
7	3	36	30x30	16x16	46 2	4	6	138	850
7	3	42	30x36	16x20	48 2½	4	6	240	1100
8	3	42	36x36	16x20	48 2½	5		240	1250
10	3	42	36x36	20x24	48 2½	7		240	1725
12	3	42	36x42	24x24	40 3	8	6	280	2000
14	3	42	36x42	24x24	40 3	10	6	280	2500
10	3	48	42x36	24x24	50 3	7		350	2000
14	3	48	42x42	24x30	50 3	10	6	350	3000
16		48	42x48	30x30	50 3	11	9	350	3600

Shell ¼-in. C. H. No. 1 iron; heads and fire-box, ⅝-in. C. H. No. 1 flange; wrought iron rings around fire door and in legs.

### HORIZONTAL TUBULARS.

Length.		Diam.	Dome.	No. Flues.	Area Chimney.	Heating S.	Capacity.
Feet.	inches.	inches.	in.		sq. inches.	sq. inches.	sq. inches.
10	36	20x20	30 3		260	280	1400
12	36	20x24	30 3		260	330	1650
10	42	20x24	40 3		350	380	1900
12	42	24x24	40 3		350	440	2200
14	42	24x24	40 3		350	480	2400
16	42	24x30	40 3		350	560	2800
14	48	24x30	50 3		440	630	3150
16	48	24x30	50 3		440	725	3625
16	54	30x36	50 3½		625	850	4250
16	60	30x36	50 4		800	975	4875
18	60	30x36	50 4		800	1250	6250

Small boilers: Shell ⅝-in. C. H. No. 1 iron; heads, ⅞-in. C. H. No. 1 flange iron.

Large boilers (54-in. and upwards): Shell ¾-in. C. H. No. 1 iron; heads, ½-in. C. H. No. 1 flange iron.

### BRICK CHIMNEYS.

Thickness of brick-work, one brick from top to twenty-five feet from top; a brick and a half from 25 to 50 ft. from top, increasing by half a brick for each additional 25 feet to bottom. The diameter at base should be not less than one-tenth the height. If the inside diameter at top exceed 4½ feet, the top length should be a brick and a half thick.

## BOILER CHIMNEYS.

For marine boilers the general rule is to allow 14 sq. in. of chimney for each nominal horse-power. For stationary boilers the area of the chimneys should be one-fifth greater than the combined area of all the flues or tubes. Where boilers are provided with other means of draught the dimensions of the chimney are not so important.

### Diameter and Height of Boiler Chimneys.

Horse pow'r of Boiler.	Height of Chimney.	Interior Diam. at Top.	Horse pow'r of Boiler.	Height of Chimney.	Interior Diam. at Top.
10	60 ft.	14 inches.	70	120 ft.	30 inches.
12	75 "	14 "	90	120 "	34 "
16	90 "	16 "	120	135 "	38 "
20	99 "	17 "	160	150 "	43 "
30	105 "	21 "	200	165 "	47 "
50	120 "	26 "	250	180 "	42 "
60	120 "	27 "	380	195 "	57 "

### Table of the Principal Alloys.

- A combination of copper and tin makes bath metal.
- A combination of copper and zinc makes bell metal.
- A combination of tin and copper makes bronze metal.
- A combination of tin, antimony, copper and bismuth makes britannia metal.
- A combination of tin and copper makes cannon metal.
- A combination of copper and zinc makes Dutch gold.
- A combination of copper, nickel and zinc, with sometimes a little iron and tin makes German silver.
- A combination of gold and copper makes standard gold.
- A combination of gold, copper and silver makes old-standard gold.
- A combination of tin and copper makes gun metal.
- A combination of copper and zinc makes mosaic gold.
- A combination of tin and lead makes pewter.
- A combination of lead and a little arsenic makes sheet metal.
- A combination of silver and copper makes standard silver.
- A combination of tin and lead makes solder.
- A combination of lead and antimony makes type metal.
- A combination of copper and arsenic makes white copper.

### How to Mix Printing Inks and Paints in the Preparation of Tints.

THE FIRST NAMED COLOR ALWAYS PREDOMINATES.

- Mixing dark green and purple makes bottle green.
- Mixing white and medium yellow makes buff tint.
- Mixing red, black and blue makes dark brown.
- Mixing bronze, blue, lemon yellow and black makes dark green.
- Mixing white, medium yellow and black makes drab tint.
- Mixing white, lake and lemon yellow makes flesh tint.

## MIXING INKS AND PAINTS.

Mixing lemon yellow and bronze blue makes grass-green.  
Mixing white and black makes gray tint.  
Mixing white and purple makes lavender tint.  
Mixing red, black and medium yellow makes maroon.  
Mixing lake and purple makes magenta.  
Mixing medium yellow and purple makes olive green.  
Mixing medium yellow and red makes orange.  
Mixing white, ultramarine blue and black makes pearl tint.  
Mixing white and lake makes pink.  
Mixing ultramarine blue and lake makes purple.  
Mixing orange, lake and purple makes russet.  
Mixing medium yellow, red and white makes sienna.  
Mixing white and ultramarine blue makes sky blue.  
Mixing ultramarine blue, black and white makes slate.  
Mixing vermillion and black makes Turkey red.  
Mixing white, yellow, red and black makes umber.

### Durability of Different Woods.

Experiments have been lately made by driving sticks, made of different woods, each two feet long and one and one-half inches square, into the ground, only one-half an inch projecting outward. It was found that in five years all those made of oak, elm, ash, fir, soft mahogany, and nearly every variety of pine, were totally rotten. Larch, hard pine and teak wood were decayed on the outside only, while acacia, with the exception of being also slightly attacked on the exterior, was otherwise sound. Hard mahogany and cedar of Lebanon were in tolerably good condition; but only Virginia cedar was found as good as when put in the ground. This is of some importance to builders, showing what woods should be avoided, and what others used by preference in underground work.

The duration of wood when kept dry is very great, as beams still exist which are known to be nearly 1,100 years old. Piles driven by the Romans prior to the Christian era have been examined of late, and found to be perfectly sound after an immersion of nearly 2,000 years.

The wood of some tools will last longer than the metals, as in spades, hoes and plows. In other tools the wood is first gone, as in wagons, wheelbarrows and machines. Such wood should be painted or oiled; the paint not only looks well, but preserves the wood; petroleum oil is as good as any other.

Hard wood stumps decay in five or six years; spruce stumps decay in about the same time; hemlock stumps in eight to nine years; cedar, eight to nine years; pine stumps, never.

Cedar, oak, yellow pine and chestnut are the most durable woods in dry places.

Timber intended for posts is rendered almost proof against rot by thorough seasoning, charring and immersion in hot coal tar.



## Specific Gravity of Various Substances.

A gallon of water or wine weighs 10 lbs., and this is taken as the basis of the following table:

LIQUIDS.		TIMBER.		METALS.	
Water.....	100	Cork.....	24	Zinc.....	719
Sea water.....	103	Poplar.....	38	Cast iron.....	721
Dead Sea.....	124	Fir.....	55	Tin.....	729
Alcohol.....	84	Cedar.....	61	Bar iron.....	779
Olive oil.....	92	Pear.....	66	Steel.....	783
Turpentine.....	99	Walnut.....	67	Copper.....	869
Wine.....	100	Cherry.....	72	Brass.....	840
Urine.....	101	Maple.....	75	Silver.....	1,051
Cider.....	102	Apple.....	79	Lead.....	1,135
Beer.....	102	Ash.....	84	Mercury.....	1,357
Woman's milk.....	102	Beech.....	85	Gold.....	1,926
Cow's ".....	103	Mahogany.....	106	Platina.....	1,950
Goat's ".....	104	Oak.....	117		
Porter.....	104	Ebony.....	133		

PRECIOUS STONES.			
Emerald.....	277.5	Diamond.....	353.0
Crystal.....	265.3	Topaz.....	401.1
		Garnet.....	406.3
		Ruby.....	423.3

SUNDRIES.			
Indigo.....	77	Peat.....	133
Gunpowder.....	93	Opium.....	134
Butter.....	94	Honey.....	145
Ice.....	117	Ivory.....	183
Clay.....	120	Brick.....	200
Coal.....	130	Sulphur.....	203
		Porcelain.....	226
		Stone.....	252
		Marble.....	270
		Granite.....	278
		Chalk.....	279
		Glass.....	289

## Weight in Cubic Feet.

	Lbs. per Cub. Ft.		Lbs. per Cub. Ft.
Cork.....	15	Brick.....	120
Cedar.....	36	Stone.....	150
Beech.....	51	Granite.....	166
Butter.....	56	Glass.....	172
Water.....	62	Iron.....	470
Mahogany.....	66	Copper.....	520
Ice.....	70	Silver.....	630
Oak.....	70	Lead.....	680
Clay.....	72	Gold.....	1,155
Coal.....	80		

## Tensile and Transverse Strength

A crushing force of 1,000 lbs. per square inch on a bar 1 inch square, and 12 inches long, gives the following ratios of strength:

	Tensile.	Transverse.		Tensile.	Transverse.
Stone.....	100	10	Cast iron.....	158	20
Glass.....	123	10	Timber.....	1,900	85

## Tensile Test of Steel.

BAR 8 INCHES LONG.					
Sq. Inch Section.	Strain, Tons per Sq. Inch.	Extension, Inches.	Sq. Inch Section.	Strain, Tons per Sq. Inch.	Extension, Inches.
1.0000	13.93	.01	.8325	28.35	1.40
.9799	16.96	.10	.7088	27.32	2.00
.9331	23.43	.40	.5541	25.05	2.20
.8741	27.23	1.00			
Elastic Limit.....		17.40 tons.	Cohesion.....	45.21	tons.
Maximum strain.....		28.35 "	Extension.....	27.35	per cent.
Breaking load.....		25.05 "	Contraction.....	44.4	"

## TENSILE STRENGTH OF STEEL.—Continued.

Taking the strength of Swedish iron at 100, the tensile strength of steel compares thus:

Swedish iron.....	100	Cannon steel.....	173
Boiler steel .....	118	Spring steel.....	202

### Pecuniary Value of Metals.

Few people have any idea of the value of precious metals other than gold, silver and copper, which are commonly supposed to be the most precious of all. There are many metals more valuable and infinitely rarer. The following table gives the names and prices of all the known metals of pecuniary worth:

	Price per Av. pound.		Price per Av. pound.
Vanadium.....	\$10.000 00	Gold .....	\$ 330 00
Rubidium.....	9.070 00	Molybdenum .....	225 00
Zirconium .....	7.200 00	Thallium .....	225 00
Lithium .....	7.000 00	Platinum .....	150 00
Glucium.....	5.400 00	Manganese .....	130 00
Calcium.....	4.500 00	Tungstein .....	115 00
Strontium.....	4.200 00	Magnesium.....	64 00
Terbium.....	4.080 00	Potassium.....	64 00
Vitrium.....	4.080 00	Aluminum.....	32 00
Erbium.....	3.400 00	Silver .....	20 00
Cerium.....	3.400 00	Cobalt.....	16 00
Didymium.....	3.200 00	Sodium.....	8 00
Indium.....	3.200 00	Nickel.....	5 00
Ruthenium.....	2.400 00	Cadmium.....	4 00
Rhodium.....	2.300 00	Bismuth.....	2 50
Niobium.....	2.300 00	Mercury.....	95
Barium.....	1.800 00	Arsenic.....	50
Palladium.....	1.400 00	Tin .....	25
Osmium.....	1.300 00	Copper.....	25
Iridium.....	1.090 00	Antimony.....	16
Uranium.....	900 00	Zinc.....	11
Titanium.....	689 00	Lead.....	08
Chromium.....	500 00		

### VALUE OF METALS AS CONDUCTORS.

	Heat.	Electricity.		Heat.	Electricity.
Gold.....	100	94	Iron.....	37	16
Platinum.....	98	16	Zinc.....	36	29
Silver.....	97	74	Tin .....	30	15
Copper.....	90	100	Lead.....	18	8

### TENACITY OF METALS.

A wire, 0.84 of a line in diameter, will sustain weights as follows:

Lead.....	28 lbs.	Silver.....	187 lbs.
Tin.....	35 "	Platinum.....	274 "
Zinc.....	110 "	Copper.....	302 "
Gold.....	150 "	Iron.....	549 "

### FLUID DENSITY OF METALS.

Zinc.....	6.48	Copper.....	8.22
Iron.....	6.88	Silver.....	9.51
Tin.....	7.03	Lead.....	10.37

# TABLE OF SQUARES AND CUBES

OF

ALL NUMBERS FROM 1 TO 500.

No.	Squares.	Cubes.	No.	Squares.	Cubes.
1	1	1	55	30 25	166 375
2	4	8	56	31 36	175 616
3	9	27	57	32 49	185 193
4	16	64	58	33 64	195 112
5	25	1 25	59	34 81	205 379
6	36	2 16	60	36 00	216 000
7	49	3 43	61	37 21	226 981
8	64	5 12	62	38 44	238 328
9	81	7 29	63	39 69	250 047
10	1 00	1 000	64	40 96	262 144
11	1 21	1 331	65	42 25	274 625
12	1 44	1 728	66	43 56	287 496
13	1 69	2 197	67	44 89	300 763
14	1 96	2 744	68	46 24	314 432
15	2 25	3 375	69	47 61	328 509
16	2 56	4 096	70	49 00	343 000
17	2 89	4 913	71	50 41	357 911
18	3 24	5 832	72	51 84	373 248
19	3 61	6 859	73	53 29	389 017
20	4 00	8 000	74	54 76	405 224
21	4 41	9 261	75	56 25	421 875
22	4 84	10 648	76	57 76	438 976
23	5 29	12 167	77	59 29	456 533
24	5 76	13 824	78	60 84	474 552
25	6 25	15 625	79	62 41	493 039
26	6 76	17 576	80	64 00	512 000
27	7 29	19 683	81	65 81	531 441
28	7 84	21 952	82	67 24	551 368
29	8 41	24 389	83	68 89	571 787
30	9 00	27 000	84	70 56	592 704
31	9 61	29 791	85	72 25	614 125
32	10 24	32 768	86	73 96	636 056
33	10 89	35 937	87	75 69	658 503
34	11 56	39 304	88	77 44	681 472
35	12 25	42 875	89	79 21	704 969
36	12 96	46 656	90	81 00	729 000
37	13 69	50 653	91	82 81	753 571
38	14 44	54 872	92	84 64	778 688
39	15 21	59 319	93	86 49	804 367
40	16 00	64 000	94	88 36	830 584
41	16 81	68 921	95	90 25	857 375
42	17 64	74 088	96	92 16	884 736
43	18 49	79 507	97	94 09	912 673
44	19 36	85 184	98	96 04	941 192
45	20 25	91 125	99	98 01	970 299
46	21 16	97 336	100	1 00 00	1 000 000
47	22 09	103 823	101	1 02 01	1 030 301
48	23 04	110 592	102	1 04 04	1 061 296
49	24 01	117 649	103	1 06 09	1 092 727
50	25 00	125 000	104	1 08 16	1 124 864
51	26 01	132 651	105	1 10 25	1 157 625
52	27 04	140 608	106	1 12 36	1 191 016
53	28 09	148 877	107	1 14 49	1 225 043
54	29 16	157 464	108	1 16 64	1 259 712

TABLE OF SQUARES AND CUBES—Continued.

No.	Squares.	Cubes.	No.	Squares.	Cubes.
109	1 18 81	1 295 029	169	2 85 61	4 826 809
110	1 21 00	1 331 000	170	2 89 00	4 913 000
111	1 23 21	1 367 631	171	2 92 41	5 000 211
112	1 25 44	1 404 928	172	2 96 84	5 088 448
113	1 27 69	1 442 897	173	2 99 29	5 177 717
114	1 29 96	1 481 544	174	3 02 76	5 268 024
115	1 32 25	1 520 875	175	3 06 25	5 359 375
116	1 34 56	1 560 896	176	3 09 76	5 451 776
117	1 36 89	1 601 613	177	3 13 29	5 545 233
118	1 39 24	1 643 032	178	3 16 84	5 639 752
119	1 41 61	1 685 159	179	3 20 41	5 735 339
120	1 44 00	1 728 000	180	3 24 00	5 832 000
121	1 46 41	1 771 561	181	3 27 61	5 929 741
122	1 48 84	1 815 848	182	3 31 24	6 028 568
123	1 51 29	1 860 867	183	3 34 89	6 128 487
124	1 53 76	1 906 624	184	3 38 56	6 229 504
125	1 56 25	1 953 125	185	3 42 25	6 331 625
126	1 58 76	2 000 376	186	3 45 96	6 434 856
127	1 61 29	2 048 383	187	3 49 69	6 539 203
128	1 63 84	2 097 152	188	3 53 44	6 644 672
129	1 66 41	2 146 689	189	3 57 21	6 751 269
130	1 69 00	2 197 000	190	3 61 00	6 859 000
131	1 71 61	2 248 091	191	3 64 81	6 967 871
132	1 74 24	2 299 968	192	3 68 64	7 077 888
133	1 76 89	2 352 637	193	3 72 49	7 189 057
134	1 79 56	2 406 104	194	3 76 36	7 301 384
135	1 82 25	2 460 375	195	3 80 25	7 414 875
136	1 84 96	2 515 456	196	3 84 16	7 529 536
137	1 87 69	2 571 353	197	3 88 09	7 645 373
138	1 90 44	2 628 072	198	3 92 04	7 762 392
139	1 93 21	2 685 619	199	3 96 01	7 880 599
140	1 96 00	2 744 000	200	4 00 00	8 000 000
141	1 98 81	2 803 221	201	4 04 01	8 120 601
142	2 01 64	2 863 288	202	4 08 04	8 242 408
143	2 04 49	2 924 207	203	4 12 09	8 365 427
144	2 07 36	2 985 984	204	4 16 16	8 489 664
145	2 10 25	3 048 625	205	4 20 25	8 615 125
146	2 13 16	3 112 136	206	4 24 36	8 741 816
147	2 16 09	3 176 523	207	4 28 49	8 869 743
148	2 19 04	3 241 792	208	4 32 64	8 998 912
149	2 22 01	3 307 949	209	4 36 81	9 129 329
150	2 25 00	3 375 000	210	4 41 00	9 261 000
151	2 28 01	3 442 951	211	4 45 21	9 393 931
152	2 31 04	3 511 808	212	4 49 44	9 528 128
153	2 34 09	3 581 577	213	4 53 69	9 663 597
154	2 37 16	3 652 264	214	4 57 96	9 800 344
155	2 40 25	3 723 875	215	4 62 25	9 938 375
156	2 43 36	3 796 416	216	4 66 56	10 077 646
157	2 46 49	3 869 893	217	4 70 89	10 218 313
158	2 49 64	3 944 312	218	4 75 24	10 360 232
159	2 52 81	4 019 679	219	4 79 61	10 503 459
160	2 56 00	4 096 000	220	4 84 00	10 648 000
161	2 59 21	4 173 281	221	4 88 41	10 793 861
162	2 62 44	4 251 528	222	4 92 84	10 941 048
163	2 65 69	4 330 747	223	4 97 29	11 089 567
164	2 68 96	4 410 944	224	5 01 76	11 239 424
165	2 72 25	4 492 125	225	5 06 25	11 390 625
166	2 75 56	4 574 286	226	5 10 76	11 543 176
167	2 78 89	4 657 463	227	5 15 29	11 697 083
168	2 82 24	4 741 632	228	5 19 84	11 852 352

TABLE OF SQUARES AND CUBES—Continued.

No.	Squares.	Cubes.	No.	Squares.	Cubes.
229	5 24 41	12 008 989	289	8 35 21	24 137 569
230	5 29 00	12 167 000	290	8 41 00	24 389 000
231	5 33 61	12 326 391	291	8 46 81	24 642 171
232	5 38 24	12 487 168	292	8 52 64	24 897 088
233	5 42 89	12 649 337	293	8 58 49	25 153 757
234	5 47 56	12 812 904	294	8 64 36	25 412 184
235	5 52 25	12 977 875	295	8 70 25	25 672 375
236	5 56 96	13 144 256	296	8 76 16	25 934 336
237	5 61 69	13 312 053	297	8 82 09	26 198 073
238	5 66 44	13 481 272	298	8 88 04	26 463 592
239	5 71 21	13 651 919	299	8 94 01	26 730 899
240	5 76 00	13 824 000	300	9 00 00	27 000 000
241	5 80 81	13 997 521	301	9 06 01	27 270 901
242	5 85 64	14 172 488	302	9 12 04	27 543 608
243	5 90 49	14 348 907	303	9 18 09	27 818 127
244	5 95 36	14 526 784	304	9 24 16	28 094 464
245	6 00 25	14 706 125	305	9 30 25	28 372 625
246	6 05 16	14 886 936	306	9 36 36	28 652 616
247	6 10 09	15 069 223	307	9 42 49	28 934 443
248	6 15 04	15 252 992	308	9 48 64	29 218 112
249	6 20 01	15 438 249	309	9 54 81	29 503 629
250	6 25 05	15 625 000	310	9 61 00	29 791 000
251	6 30 01	15 813 251	311	9 67 21	30 080 231
252	6 35 04	16 003 008	312	9 73 44	30 371 328
253	6 40 09	16 194 277	313	9 79 69	30 664 297
254	6 45 16	16 387 064	314	9 85 96	30 959 144
255	6 50 25	16 581 375	315	8 92 25	31 255 875
256	6 55 36	16 777 216	316	9 98 56	31 554 496
257	6 60 49	16 974 593	317	10 04 89	31 855 013
258	6 65 64	17 173 512	318	10 11 24	32 157 432
259	6 70 81	17 373 979	319	10 17 61	32 461 759
260	6 76 00	17 576 000	320	10 24 00	32 768 000
261	6 81 21	17 779 581	321	10 30 41	33 076 161
262	6 86 44	17 984 728	322	10 36 84	33 386 248
263	6 91 69	18 191 447	323	10 43 29	33 698 267
264	6 96 96	18 399 744	324	10 49 76	34 012 224
265	7 02 25	18 609 625	325	10 56 25	34 328 125
266	7 06 56	18 821 096	326	10 62 76	34 646 976
267	7 12 89	19 034 163	327	10 69 29	34 966 793
268	7 18 24	19 248 832	328	10 75 84	35 287 552
269	7 23 61	19 465 109	329	10 82 41	35 611 259
270	7 29 00	19 683 000	330	10 89 00	35 937 080
271	7 34 41	19 902 511	331	10 95 61	36 264 091
272	7 39 84	20 123 648	332	11 02 24	36 594 368
273	7 45 29	20 346 417	333	11 08 89	36 926 637
274	7 50 76	20 570 824	334	11 15 56	37 259 704
275	7 56 25	20 796 875	335	11 22 25	37 595 375
276	7 61 76	21 024 576	336	11 28 96	37 933 056
277	7 67 29	21 253 933	337	11 35 69	38 272 753
278	7 72 84	21 484 952	338	11 42 44	38 614 472
279	7 78 41	21 717 639	339	11 49 21	38 958 219
280	7 84 00	21 952 000	340	11 56 00	39 304 000
281	7 89 61	22 188 041	341	11 62 81	39 651 681
282	7 95 24	22 425 768	342	11 69 64	40 001 088
283	8 00 89	22 665 187	343	11 76 49	40 353 007
284	8 06 56	22 906 304	344	11 83 36	40 707 584
285	8 12 25	23 149 125	345	11 90 25	41 063 625
286	8 17 96	23 393 656	346	11 97 16	41 421 736
287	8 23 69	23 639 903	347	12 04 09	41 781 923
288	8 29 44	23 887 872	348	12 11 04	42 144 192

TABLE OF SQUARES AND CUBES—Continued.

No.	Squares.	Cubes.	No.	Squares.	Cubes.
349	12 18 01	42 508 549	409	16 72 81	68 417 929
350	12 25 00	42 875 000	410	16 81 00	68 921 000
351	12 32 01	43 243 551	411	16 89 21	69 426 531
352	12 39 04	43 614 208	412	16 97 44	69 934 528
353	12 46 09	43 986 977	413	17 05 69	70 444 997
354	12 53 16	44 361 864	414	17 13 96	70 957 944
355	12 60 25	44 738 875	415	17 22 25	71 473 375
356	12 67 36	45 118 016	416	17 30 56	71 991 296
357	12 74 49	45 499 293	417	17 38 89	72 511 713
358	12 81 64	45 882 712	418	17 47 24	73 034 632
359	12 88 81	46 268 279	419	17 55 61	73 560 059
360	12 96 00	46 656 000	420	17 64 00	74 088 000
361	13 03 21	47 045 881	421	17 72 41	74 618 461
362	13 10 44	47 437 928	422	17 80 84	75 151 448
363	13 17 69	47 832 147	423	17 89 29	75 686 967
364	13 24 96	48 228 544	424	17 97 76	76 225 024
365	13 32 25	48 627 125	425	18 06 25	76 766 625
366	13 39 56	49 027 896	426	18 14 76	77 308 776
367	13 46 89	49 430 863	427	18 23 29	77 854 483
368	13 54 24	49 836 032	428	18 31 84	78 402 752
369	13 61 61	50 243 409	429	18 40 40	78 953 539
370	13 69 00	50 653 000	430	18 49 00	79 507 000
371	13 76 41	51 064 811	431	18 57 61	80 062 991
372	13 83 84	51 478 848	432	18 66 24	80 621 568
373	13 91 29	51 895 117	433	18 74 89	81 182 737
374	13 98 76	52 313 624	434	18 83 56	81 746 504
375	14 06 25	52 734 375	435	18 92 25	82 312 875
376	14 13 76	53 157 376	436	19 00 96	82 881 856
377	14 21 29	53 582 633	437	19 09 69	83 453 453
378	14 28 84	54 010 152	438	19 18 44	84 027 672
379	14 36 41	54 439 939	439	19 27 21	84 604 519
380	14 44 00	54 872 000	440	19 36 00	85 184 000
381	14 51 61	55 306 341	441	19 44 81	85 766 121
382	14 59 24	55 742 968	442	19 53 64	86 350 888
383	14 66 89	56 181 887	443	19 62 49	86 938 307
384	14 74 56	56 623 104	444	19 71 36	87 528 284
385	14 82 25	56 066 625	445	19 80 25	88 121 125
386	14 89 96	57 512 456	446	19 89 16	88 716 536
387	14 97 69	57 960 603	447	20 98 09	89 314 623
388	15 05 44	58 411 072	448	20 07 04	89 915 392
389	15 13 21	58 863 869	449	20 16 01	90 518 849
390	15 21 00	59 319 000	450	20 25 00	91 125 000
391	15 28 81	59 776 471	451	20 34 01	91 733 751
392	15 36 64	60 236 288	452	20 43 04	92 345 408
393	15 44 49	60 698 457	453	20 52 09	92 959 677
394	15 52 36	61 162 984	454	20 61 16	93 576 664
395	15 60 25	61 629 875	455	20 70 25	94 196 375
396	15 68 16	62 099 136	456	20 79 36	94 818 816
397	15 76 09	62 570 773	457	20 88 49	95 443 993
398	15 84 04	63 044 792	458	21 97 64	96 071 912
399	15 92 01	63 521 199	459	21 06 81	96 702 579
400	16 00 00	64 000 000	460	21 16 00	97 336 000
401	16 08 01	64 481 201	461	21 25 21	97 972 181
402	16 16 04	64 964 808	462	21 34 44	98 611 128
403	16 24 09	65 450 827	463	21 43 69	99 252 847
404	16 32 16	65 939 264	464	21 52 96	99 897 344
405	16 40 25	66 430 125	465	21 62 25	100 554 625
406	16 48 36	66 923 416	466	21 71 56	101 194 696
407	16 56 49	67 419 143	467	21 80 89	101 847 563
408	16 64 64	67 917 321	468	21 90 24	102 503 232

**TABLE OF SQUARES AND CUBES—*Concluded.***

No.	Squares.	Cubes.	No.	Squares.	Cubes.
469	21 99 61	103 161 709	485	23 52 25	114 084 125
470	22 09 00	103 823 000	486	23 61 96	114 791 256
471	22 18 41	104 487 111	487	23 71 69	115 501 303
472	22 27 84	105 154 048	488	23 81 44	116 214 572
473	22 37 29	105 823 817	489	23 91 21	116 930 169
474	22 46 76	106 496 424	490	24 01 00	117 649 000
475	22 56 25	107 171 875	491	24 10 81	118 370 771
476	22 65 76	107 850 176	492	24 20 64	119 095 488
477	22 75 29	108 531 333	493	24 30 49	119 823 157
478	22 84 84	109 215 352	494	24 40 36	120 553 784
479	22 94 41	109 902 239	495	24 50 25	121 287 375
480	23 04 00	110 592 000	496	24 60 16	122 023 936
481	23 13 61	111 284 641	497	24 70 09	122 763 473
482	23 23 24	111 980 168	498	24 80 04	123 505 992
483	23 32 89	112 678 587	499	24 90 01	124 251 499
484	23 42 56	113 379 904	500	25 00 00	125 000 000

### LENGTH OF CIRCULAR ARC.

Huygens' approximation to length of a circular arc:

A = Chord of any circular arc.

B = Chord of half that arc.

R = Radius of the circular arc.

L = Length of the circular arc.

Then

$$L = \frac{8B - A}{3}$$

Or, as it is usually written,

$$L = 2B + \frac{1}{3}(2B - A).$$

### WEDDING ANNIVERSARIES.

First, cotton; second, paper; third, leather; fifth, wooden; seventh, woolen; tenth, tin; twelfth, silk and fine linen; fifteenth, crystal; twentieth, china; twenty-fifth, silver; thirtieth, pearl; fortieth, ruby; fiftieth, golden; seventy-fifth, diamond.

### YOUR BIRTHDAY.

Born on Monday, fair in face;

Born on Tuesday, full of God's grace;

Born on Wednesday, the best to be had;

Born on Thursday, merry and glad;

Born on Friday, worthily given;

Born on Saturday, work hard for a living;

Born on Sunday, shall never know want.

AN indenture is a deed or instrument in writing. Originally such writings were made in duplicate upon a sheet of paper which was afterwards indented or cut apart in a waved or notched line. One piece was given to each of the parties to the contract, and when the two were put together they would, of course, fit into each other exactly. This mode of indenture has passed out of use, but the term survives.

# NATURAL SINES, ETC.

Deg.	Sine.	Cover.	Cosecant.	Tangt.	Cotang.	Secant.	Versin.	Cosin.	Deg.
0	.00	1.00000	Infinite.	.0	Infinite.	1.00000	.0	1.00000	90
1	.01745	.98254	57.2896	.01745	57.2899	1.00015	.0001	.99984	89
2	.03489	.96510	28.6537	.03492	28.6362	1.00060	.0006	.99939	88
3	.05233	.94766	19.1073	.05240	19.0811	1.00137	.0013	.99862	87
4	.06975	.93024	14.3355	.06992	14.3006	1.00244	.0024	.99756	86
5	.08715	.91284	11.4737	.08748	11.4300	1.00381	.0038	.99619	85
6	.10452	.89547	9.5667	.10510	9.5143	1.00550	.0054	.99452	84
7	.12186	.87813	8.2055	.12278	8.1443	1.00750	.0074	.99254	83
8	.13917	.86082	7.1852	.14054	7.1153	1.00982	.0097	.99026	82
9	.15643	.84356	6.3924	.15838	6.3137	1.01246	.0123	.98768	81
10	.17364	.82635	5.7587	.17632	5.6712	1.01542	.0151	.98480	80
11	.19080	.80919	5.2408	.19438	5.1445	1.01871	.0183	.98162	79
12	.20791	.79208	4.8097	.21255	4.7046	1.02234	.0218	.97814	78
13	.22495	.77504	4.4454	.23086	4.3314	1.02630	.0256	.97437	77
14	.24192	.75807	4.1335	.24932	4.0107	1.03061	.0297	.97029	76
15	.25881	.74118	3.8637	.26794	3.7320	1.03527	.0340	.96592	75
16	.27563	.72436	3.6279	.28674	3.4874	1.04029	.0387	.96126	74
17	.29237	.70762	3.4203	.30573	3.2708	1.04569	.0436	.95630	73
18	.30901	.69098	3.2360	.32491	3.0776	1.05146	.0489	.95105	72
19	.32556	.67443	3.0715	.34432	2.9042	1.05762	.0544	.94551	71
20	.34202	.65797	2.9238	.36397	2.7474	1.06417	.0603	.93969	70
21	.35836	.64163	2.7904	.38386	2.6050	1.07114	.0664	.93358	69
22	.37460	.62539	2.6694	.40402	2.4750	1.07853	.0728	.92718	68
23	.39073	.60926	2.5593	.42447	2.3558	1.08636	.0794	.92050	67
24	.40673	.59326	2.4585	.44522	2.2460	1.09463	.0864	.91354	66
25	.42261	.57738	2.3662	.46630	2.1445	1.10337	.0936	.90630	65
26	.43837	.56162	2.2811	.48773	2.0503	1.11260	.1012	.89879	64
27	.45399	.54600	2.2026	.50952	1.9626	1.12232	.1089	.89100	63
28	.46947	.53052	2.1300	.53170	1.8807	1.13257	.1170	.88294	62
29	.48480	.51519	2.0626	.55430	1.8040	1.14335	.1253	.87461	61
30	.50000	.50000	2.0000	.57735	1.7320	1.15470	.1339	.86602	60
31	.51503	.48496	1.9416	.60086	1.6642	1.16663	.1428	.85716	59
32	.52991	.47008	1.8870	.62486	1.6003	1.17917	.1519	.84804	58
33	.54463	.45536	1.8360	.64940	1.5398	1.19236	.1613	.83867	57
34	.55919	.44080	1.7882	.67450	1.4825	1.20621	.1709	.82903	56
35	.57357	.42642	1.7434	.70020	1.4281	1.22077	.1806	.81915	55
36	.58778	.41221	1.7013	.72654	1.3763	1.23606	.1909	.80901	54
37	.60181	.39818	1.6616	.75355	1.3270	1.25213	.2013	.79863	53
38	.61566	.38433	1.6242	.78128	1.2799	1.26901	.2119	.78801	52
39	.62932	.37067	1.5890	.80978	1.2348	1.28675	.2232	.77714	51
40	.64278	.35721	1.5557	.83909	1.1917	1.30540	.2339	.76604	50
41	.65605	.34394	1.5242	.86928	1.1503	1.32501	.2452	.75470	49
42	.66913	.33086	1.4944	.90040	1.1106	1.34563	.2568	.74314	48
43	.68199	.31800	1.4662	.93251	1.0723	1.36732	.2686	.73135	47
44	.69465	.30534	1.4395	.96568	1.0355	1.39016	.2806	.71933	46
45	.70710	.29289	1.4142	1.00000	1.0000	1.41421	.2928	.70710	45
	Cosin.	Versin.	Secant.	Cotang.	Tangt.	Cosecant.	Cover.	Sine.	

THE term bankrupt originated in connection with the money-changers of Italy. They sat in the market-place with their money displayed on a bench (or *banc*, as it was called) before them. When one of these financial gentlemen failed his *banc* (or bench) was said to be broken, and he was styled a bankrupt. The modern bank inherits its name from the unimposing money-bench (*banc*) of mediæval Italy.



# Useful Information for Printers and Publishers.

## Standard Newspaper Measure.

The standard newspaper measure, as recognized and now in general use, is 13 ems pica. The standard of measurement of all sizes of type is the em quad, not the letter m.

### Leads and Slugs.

Leads are designated as “—to-pica,” the number being that fraction of a pica which the lead is, viz.: a 6-to-pica lead is one-sixth of a pica in thickness, or six 6-to-pica’s are equal to one pica; four 4-to-pica’s one pica, and so with other sizes or thicknesses of leads.

SLUGS—“Leads” of nonpareil thickness and greater are called slugs, viz.: nonpareil slugs, brevier slugs, pica slugs, etc.

### Average Weight of Matter.

A “piece” of solid matter 13 ems pica wide and 6 inches long will weigh about  $3\frac{3}{8}$  lbs., but, in order to allow for the sorts usually remaining in case  $4\frac{3}{8}$  lbs. of type would be required to set that amount of solid matter. When the matter is to be leaded the weight of the type may be reduced about one-quarter, i. e., a single column of six-column folio, solid, will weigh  $10\frac{1}{8}$  lbs., requiring about 13 lbs. of type, while the same length column, leaded with 6-to-pica leads, will contain but  $7\frac{7}{8}$  lbs. solid matter, requiring about 10 lbs. of type to set the same.

EXAMPLE—A single page of regular six-column folio or quarto ( $13 \times 19\frac{3}{4}$ ) contains  $256\frac{3}{4}$  square inches of matter:

$256\frac{3}{4} \times 4\frac{3}{8} \div 13$  (square inches of  $4\frac{3}{8}$  lbs. of type) =  $86+$ , the number of pounds of type required to set that amount of matter, including sorts in case.

### How to Estimate for Body Type.

To estimate the quantity of type (solid) necessary to fill a given space, multiply the number of square inches by  $5\frac{3}{8}$  (estimated weight, in ounces, of one square inch of matter, including sorts in case) divide the product by 16, and the result will be the weight of type required. If leaded, a reduction in weight of type may be made as above.

EXAMPLE—A single page of regular six-column folio or quarto ( $13 \times 19\frac{3}{4}$ ) contains  $256\frac{3}{4}$  square inches of matter:

$256\frac{3}{4} \times 5\frac{3}{8} \div 16 = 86+$ , the number of pounds of type required to set that amount of matter, including sorts in case.

### Miscellaneous Information.

The following table gives the number of “ems” in a space 6x13 ems pica, also the average number of “ems” in 4 ounces:

Number of Ems in	Pearl	Agate	No’pl	Min’n	Brev’r	Bourg	Lg. Pr	Sm. Pi	Pica
6x13 Ems Pica.....	449 $\frac{1}{8}$	368 $\frac{3}{8}$	312	230 $\frac{3}{8}$	177	138 $\frac{3}{8}$	112 $\frac{3}{8}$	92	78
4 Ounces.....	196	165	132	100	78	61	51	43	35

## Newspaper Measurement.

Table showing the number of ems of the different sizes of newspaper type in a line, the number of lines necessary to make 1,000 ems, and the length in inches. Also the number of ems in the regular lengths of columns:

13 EMS PICA, WIDTH OF STANDARD COLUMN.	No. Em. in line.	No. Lines 1,000 Em.	No. Inch's 1,000 Em.	4 Col. Folio, or Quarto, No. Em. in Column.	5 Col. Folio, or Quarto, Em. in Col.	6 Col. Folio, or Quarto, Em. in Col.	7 Col. Folio, or Quarto, Em. in Col.	8 Col. Folio, Em. in Col.	9 Col. Folio, Em. in Col.
	No. Em. in line.	No. Lines 1,000 Em.	No. Inch's 1,000 Em.	4 Col. Folio, or Quarto, No. Em. in Column.	5 Col. Folio, or Quarto, Em. in Col.	6 Col. Folio, or Quarto, Em. in Col.	7 Col. Folio, or Quarto, Em. in Col.	8 Col. Folio, Em. in Col.	9 Col. Folio, Em. in Col.
Agate .....	28 $\frac{1}{3}$	35 $\frac{1}{3}$	22 $\frac{1}{3}$	5,040	6,505	7,180	7,900	8,630	9,310
Nonpareil .....	26	38 $\frac{1}{2}$	31 $\frac{1}{4}$	4,325	5,615	6,160	6,785	7,410	8,020
Minion .....	22 $\frac{1}{4}$	45	43 $\frac{1}{8}$	3,175	4,115	4,515	4,970	5,440	5,885
Brevier .....	19 $\frac{1}{2}$	51 $\frac{1}{3}$	52 $\frac{1}{3}$	2,465	3,200	3,510	3,865	4,220	4,575
Bourgeois .....	17 $\frac{1}{2}$	57 $\frac{1}{3}$	7 $\frac{1}{4}$	1,950	2,525	2,770	3,050	3,330	3,615
Long Primer .....	15 $\frac{1}{2}$	64 $\frac{1}{2}$	9	1,610	2,085	2,290	2,520	2,755	2,970

## Leads for Newspapers.

Table showing the number of leads, 13 ems pica long, contained in one pound, and the number required to lead 1,000 ems of matter; together with the number of leads in a single column of matter, regular sizes of newspapers:

SIZE OF BODY TYPE TO BE LEADED WITH 6-TO-PICA LEADS.	No. Leads to pound.	No. Leads 1,000 Em.	4 Col. Fol. or Quarto, Leads in Column.	5 Col. Fol. or Quarto, Leads in Column.	6 Col. Fol. or Quarto, Leads in Column.	7 Col. Fol. or Quarto, Leads in Column.	8 Col. Fol. Leads in Column.	9 Col. Fol. Leads in Column.
	No. Leads to pound.	No. Leads 1,000 Em.	4 Col. Fol. or Quarto, Leads in Column.	5 Col. Fol. or Quarto, Leads in Column.	6 Col. Fol. or Quarto, Leads in Column.	7 Col. Fol. or Quarto, Leads in Column.	8 Col. Fol. Leads in Column.	9 Col. Fol. Leads in Column.
Agate .....	60	26	132	170	185	206	224	241
Nonpareil .....	60	29	125	162	179	197	215	233
Minion .....	60	34	108	140	154	169	185	201
Brevier .....	60	40	99	123	141	155	169	183
Bourgeois .....	60	45	88	114	125	138	150	163
Long Primer .....	60	52	84	108	119	131	143	154

## Book Work Measurement.

Table showing the number of ems to a line, and the number of lines contained in 1,000 ems of matter, standard book measure. Also, the space, in inches, filled by 1,000 ems of matter of the different measures:

SIZE OF TYPE.	21 EMS PICA.			23 EMS PICA.			25 EMS PICA.		
	No. Em. in Line.	No. Lines 1,000 Em.	No. Inch's 1,000 Em.	No. Em. in Line.	No. Lines 1,000 Em.	No. Inch's 1,000 Em.	No. Em. in Line.	No. Lines 1,000 Em.	No. Inch's 1,000 Em.
Nonpareil .....	42	24	2	46	21 $\frac{1}{2}$	1 $\frac{1}{4}$	50	20	1 $\frac{1}{3}$
Brevier .....	31 $\frac{1}{2}$	31 $\frac{1}{4}$	3 $\frac{1}{2}$	35	28 $\frac{1}{8}$	3 $\frac{1}{4}$	37 $\frac{1}{2}$	26 $\frac{1}{4}$	3 $\frac{1}{8}$
Long Primer .....	25 $\frac{1}{4}$	31 $\frac{1}{2}$	5 $\frac{1}{2}$	27 $\frac{5}{8}$	36	5	30	33 $\frac{1}{2}$	4 $\frac{5}{8}$
Small Pica .....	23	43 $\frac{1}{2}$	6 $\frac{1}{4}$	25	40	6 $\frac{1}{2}$	27 $\frac{1}{2}$	36 $\frac{1}{4}$	5 $\frac{3}{8}$
Pica .....	21	48	8	23	43 $\frac{1}{2}$	7 $\frac{1}{4}$	25	40	6 $\frac{1}{4}$

### Leads for Book Work.

Number of 4-to-pica and 6-to-pica leads, standard book measures, contained in one pound, and number required to lead 1,000 ems of matter of the standard sizes of book type:

25 EMS.	23 EMS.	21 EMS.	The columns of figures on the right give the number of leads required to lead 1,000 ems of matter of the sizes of type named. Those on the left, the number of leads in one pound.					Nonpareil.	Brevier.	Lg. Primer.	Small Pica.	Pica.
No. Leads to Pound.	No. Leads to Pound.	No. Leads to Pound.										
31	34	37	4-to-Pica...	21 Ems P'a long	17	25	33	36	41			
				23 " " "	15	23	30	34	37			
				25 " " "	13	21	27	32	33			
			6-to-Pica...	21 " " "	16	23	30	33	39			
21	23	25		23 " " "	14	21	27	31	35			
				25 " " "	12	19	25	28	31			

### Sizes of Newspapers.

TERM.		SIZE.
Five-column	Folio - - - - -	20 x 26 inches
Six-column	Folio - - - - -	22 x 31 inches
Six-column	Folio, extra margin - - -	22 x 32 inches
Seven-column	Folio - - - - -	24 x 35 inches
Seven-column	Folio, extra margin - - -	24 x 36 inches
Eight-column	Folio - - - - -	26 x 40 inches
Nine-column	Folio - - - - -	28 x 44 inches
Four-column	Quarto - - - - -	22 x 31 inches
Five-column	Quarto - - - - -	26 x 40 inches
Six-column	Quarto - - - - -	30 x 44 inches
Seven-column	Quarto - - - - -	35 x 48 inches

### Common Sizes of Flat Papers.

NAME.	SIZE.	NAME.	SIZE.
Flat Letter - -	10 x 16	Medium - - -	18 x 23
Small Cap - - -	13 x 16	Double Small Cap - -	16 x 26
Flat Cap - - -	14 x 17	Royal - - -	19 x 24
Demy - - -	16 x 21	Double Cap - -	17 x 28
Folio - - -	17 x 22		

### MEASUREMENT BY SQUARE INCHES.

With the following table the printer dispenses entirely with a type measure proper, resorting to the common inch rule. After getting the square inches in his job, he may take the figures directly from the table, or, if the square inches are in excess of the table, add two or more of the numbers together; as, for instance, 79 square inches of brevier, the seventh line gives 567 ems for 7 inches, add a cipher and you have 5,670 ems for 70

# SQUARE-INCH TYPE MEASUREMENT.

inches, and in the ninth line add 729 ems to the 5,670 ems, and you have a total of 6,399 ems in 79 square inches.

## NUMBER OF EMS IN SQUARE INCHES.

(Adapted to the Point System.)

	Pica.	Small Pica.	Long Primer	Bourgeois.	Brevier.	Minion.	Nonpareil.
1 square inch. ....	36	44	52	64	81	108	144
2 " inches. ....	72	88	104	128	162	212	288
3 " " ....	108	132	156	192	243	318	432
4 " " ....	144	176	208	256	324	424	576
5 " " ....	180	220	260	320	405	530	720
6 " " ....	216	244	312	384	486	636	864
7 " " ....	252	308	364	448	567	742	1008
8 " " ....	288	352	416	512	648	848	1152
9 " " ....	324	396	468	576	729	954	1296
10 " " ....	360	440	520	640	810	1060	1440
11 " " ....	396	484	572	704	891	1166	1584
12 " " ....	432	528	624	768	972	1272	1728
13 " " ....	468	572	676	832	1053	1378	1872
14 " " ....	504	616	728	896	1134	1484	2016
15 " " ....	540	660	780	960	1215	1590	2160
16 " " ....	576	704	832	1024	1296	1696	2304
17 " " ....	612	748	884	1088	1377	1802	2442
18 " " ....	648	792	936	1152	1458	1908	2592
19 " " ....	684	803	988	1216	1539	2014	2736
20 " " ....	720	880	1040	1280	1620	2120	2880
21 " " ....	756	924	1092	1344	1701	2226	3024
22 " " ....	792	968	1144	1408	1782	2332	3168
23 " " ....	828	1012	1196	1472	1863	2438	3312
24 " " ....	864	1056	1248	1536	1944	2544	3456
25 " " ....	900	1100	1300	1600	2025	2650	3600
26 " " ....	936	1144	1352	1664	2106	2756	3744
27 " " ....	972	1188	1404	1728	2187	2862	3888
28 " " ....	1008	1232	1456	1792	2268	2968	4032
29 " " ....	1044	1276	1508	1856	2349	3074	4176
30 " " ....	1080	1320	1560	1920	2430	3180	4320
31 " " ....	1116	1364	1612	1984	2511	3286	4464
32 " " ....	1152	1408	1664	2048	2592	3392	4608
33 " " ....	1188	1452	1716	2112	2673	3498	4752
34 " " ....	1224	1496	1768	2176	2754	3604	4896
35 " " ....	1260	1540	1820	2240	2835	3710	5040
36 " " ....	1296	1584	1872	2304	2916	3816	5184
37 " " ....	1332	1628	1924	2368	2997	3922	5328
38 " " ....	1368	1672	1976	2432	3078	4028	5472
39 " " ....	1404	1716	2028	2496	3159	4134	5616
40 " " ....	1440	1760	2080	2560	3240	4240	5760
41 " " ....	1476	1804	2132	2624	3321	4346	5904
42 " " ....	1512	1848	2184	2688	3402	4452	6048
43 " " ....	1548	1892	2236	2752	3483	4558	6192
44 " " ....	1584	1936	2288	2816	3564	4664	6336
45 " " ....	1620	1980	2340	2880	3645	4770	6480
46 " " ....	1656	2024	2392	2944	3726	4876	6624
47 " " ....	1692	2068	2444	3008	3807	4982	6768
48 " " ....	1728	2112	2496	3072	3888	5088	6912
49 " " ....	1764	2156	2548	3136	3969	5194	7056
50 " " ....	1800	2200	2600	3200	4050	5300	7200

# **SIZES OF BOOK AND PRINT PAPERS.**

TO FIND WEIGHT OF A GIVEN SIZE TO CORRESPOND WITH BULK OF SAMPLE.

**RULE**—To find weight required for a given size to correspond in thickness with a given sample, multiply the weight of sample by the dimensions of sheet required, and divide by the product of the dimensions of sample. The table below gives all the regular sizes:

Size and Weight of Sample.		22 x 32.	24 x 36.	25 x 38.	28 x 40.	28 x 42.	30 x 40.	40 x 48.
	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
22x32—	25	—	31	34	37	42	43	68
	30	—	37	40	44	50	51	82
	35	—	43	47	52	58	60	95
	40	—	49	54	59	67	68	109
24x36—	30	24	—	33	36	41	42	67
	35	29	—	38	42	48	49	78
	40	33	—	44	48	54	56	89
	45	37	—	49	54	61	62	100
	50	41	—	55	60	68	69	111
	60	49	—	66	72	82	83	133
25x38—	35	26	32	—	38	43	44	71
	40	30	36	—	44	50	51	81
	50	37	45	—	55	62	63	101
	60	44	55	—	66	74	76	121
	70	52	64	—	77	87	88	141
	80	59	73	—	88	99	101	162
28x42—	40	24	29	32	35	—	41	65
	45	27	33	36	40	—	46	73
	50	30	37	40	44	—	51	82
	60	36	44	48	53	—	61	98
	70	42	51	57	62	—	71	114
	80	48	59	65	71	—	82	131
	90	54	66	74	80	—	92	147
	100	60	74	82	88	—	102	163
30x40—	40	23	29	32	35	39	—	64
	50	29	36	40	43	49	—	80
	60	35	43	48	52	59	—	96
	70	41	50	55	61	69	—	112
	80	47	58	63	69	78	—	128
	90	53	65	71	78	88	—	144
	100	59	72	79	87	98	—	160

For 32x44 (which is just double 22x32) multiply the figures of 22x32 by 2. Likewise 38x50 is double 25x38, etc. For odd sizes proceed as per rule above.

# WEATHER FORECASTS.

Almanac predictions can be nothing but conjecture, the earth's subjection to many unknowable and undeterminable forces rendering such calculations impossible. It is practicable, however, by the following rules, drawn from actual results during very many years and applied with due regard to the subjects of solar and lunar attraction with reference to this planet, to foresee the kind of weather *most likely* to follow the moon's change of phase.

## PROGNOSTICATIONS.

If New Moon First Qr., Full Moon or Last Qr. happens			In Summer.	In Winter.
Between midnight and 2	A.M.	Fair	.....	Frost, unless wind is S. W.
" 2	" 4 "	Cold and showers	.....	Snow and stormy.
" 4	" 6 "	Rain	.....	Rain.
" 6	" 8 "	Wind and rain	.....	Stormy.
" 8	" 10 "	Changeable	.....	Cold rain if wind W., snow if
" 10	" 12 "	Frequent showers	.....	Cold and high wind. [E.
" 12	" 2 P.M.	Very rainy	.....	Snow or rain.
" 2	" 4 "	Changeable	.....	Fair and mild.
" 4	" 6 "	Fair	.....	Fair. [E.
" 6	" 8 "	Fair if wind N. W.	.....	Fair and frosty if wind N. or N.
" 8	" 10 "	Rainy if S. or S. W.	.....	Rain or snow if S. or S. W.
" 10	" midn't.	Fair	.....	Fair and frosty.

- OBSERVATIONS.—1. The nearer the moon's change, first quarter, full and last quarter to *midnight*, the fairer will be the weather during the next seven days.  
 2. The space for this calculation occupies from ten at night till two next morning.  
 3. The nearer to *midday* or *noon* the phase of the moon happens, the more foul or wet weather may be expected during the next seven days.  
 4. The space for this calculation occupies from ten in the forenoon to two in the afternoon. These observations refer principally to summer, though they affect spring and autumn in the same ratio.  
 5. The moon's change, first quarter, full and last quarter happening during six of the afternoon hour, *i. e.*, from four to ten, may be followed by fair weather, but this is mostly dependent on the *wind* as is noted in the table.  
 6. Though the weather, from a variety of irregular causes, is more uncertain in the latter part of autumn, the whole of winter and the beginning of spring, yet, in the main, the above observations will apply to these periods also.  
 7. To prognosticate correctly, especially in those cases where the *wind* is concerned, the observer should be within sight of a *vane* where the four cardinal points of the compass are correctly placed.

MEN must learn that in this theater of man's life it is reserved only for God and the angels to be lookers-on.—LORD BACON.

"OLD men for council, young men for war," is the motto on which a Senate is constituted. When Rome was sacked by the Gauls the Senate thought it unbecoming in their body to withdraw with the rest of the population. So they sat at their several thresholds and calmly awaited the end. The barbarians were amazed at the white-bearded figures and regarded them at first with some awe. Gradually they dared to stroke their beards and pass their hands over their bodies. At length finding that they were but mortal men they destroyed them. The Constitution of the United States recognizes the importance of age in limiting eligibility to the Senate to those who have reached the age of thirty years.

## WEATHER FORECASTS.

Certain phenomena in the air and peculiarities of birds have long been known to indicate a change in the weather. Many years ago the learned Dr. Jenner embodied these in verse, in reply to an invitation from a friend with whom he had planned an excursion the following day. It embodies about all that is known to-day upon that branch of the subject, and we reproduce it as being reasonably correct:

The hollow winds begin to blow,  
The clouds look black, the glass is low;  
The soot falls down, the spaniels sleep,  
And spiders from their cobwebs peep.  
Last night the sun went pale to bed,  
The moon in halos hid her head;  
The boding shepherd heaves a sigh,  
For, see, a rainbow spans the sky;  
The walls are damp, the ditches smell,  
Closed is the pink-eyed pimpernel.  
Hark! how the chairs and tables crack,  
Old Betty's joints are on the rack;  
Loud quack the ducks, the peacocks cry,  
The distant hills are looking nigh.  
How restless are the snorting swine,  
The busy flies disturb the kine;  
Low o'er the grass the swallow wings;  
The cricket, too, how sharp he sings;  
Puss, on the hearth, with velvet paws,  
Sits, wiping o'er her whiskered jaws.  
Through the clear stream the fishes rise,  
And nimbly catch th' incautious flies;  
The glow-worms, numerous and bright,  
Illum'd the dewy dell last night.  
At dusk the squalid toad was seen,  
Hopping and crawling o'er the green;  
The whirling wind the dust obeys,  
And in the rapid eddy plays;  
The frog has changed his yellow vest,  
And in a russet coat is dressed.  
Though June, the air is cold and still;  
The blackbird's mellow voice is shrill.  
My dog, so alter'd is his taste,  
Quits mutton bones, on grass to feast;  
And see yon rooks, how odd their flight,  
They imitate the gliding kite,  
And seem precipitate to fall—  
As if they felt the piercing ball.  
'Twill surely rain, I see with sorrow,  
Our jaunt must be put off tomorrow.

THE most dreadful earthquake on record is that which, November 1, 1775, destroyed the city of Lisbon, Portugal. The only warning the inhabitants received was a noise like subterranean thunder, which, without any considerable interval, was followed by a succession of shocks which laid in ruins almost every building in the city, with a most incredible slaughter of the inhabitants (60,000). The bed of the river Tagus was in many places raised to the surface, and vessels on the river suddenly found themselves aground. The waters of the river and the sea at first retreated, and then immediately rolled violently in upon the land, forming a wave over forty feet in elevation. To complete the destruction a large quay, upon which great numbers of the people had assembled for security, suddenly sank to such an unfathomable depth that not one body ever afterwards appeared at the surface.

## SHOEMAKERS' MEASURE.

**SMALL SIZES**—No. 1. 4 1-8th in.

No. 2. 4 1-8th in. + 1-3d = 4 11-24th in.

No. 3. 4 1-8th in. + 1-3d + 1-3d = 4 19-24th in.

Etc., etc., etc.

**LARGE SIZES**—No. 1. 8 11-24 in.

No. 2. 8 11-24 in. + 1-3d = 8 19-24 in.

No. 3. 8 11-24 in. + 1-3d + 1-3d = 9 1-8th in.

No. 4. 8 11-24 in. + 1-3d + 1-3d + 1-3d = 9 11-

24th in. Etc., etc., etc.

## WOMAN'S CHANCES OF MARRIAGE.

This curiously constructed exhibit by Mr. Finlayson, a European statistician, is drawn up from the registered cases of 1,000 married women, taken without selection. Of the 1,000 tabulated there were married:

Marriages.	Years of Age.	Marriages.	Years of Age.
32 .....	14 to 15	41 .....	28 to 29
101 .....	16 " 17	18 .....	30 " 31
219 .....	18 " 19	15 .....	32 " 33
230 .....	20 " 21	8 .....	34 " 35
165 .....	22 " 24	4 .....	36 " 37
102 .....	24 " 25	2 .....	38 " 39
60 .....	26 " 27		

**THE DAYS OF THE WEEK.**—The names of these are derived from Saxon idolatry. The Saxons had seven deities more particularly adored than the rest, namely: The Sun, Moon, Tuisco, Woden, Thor, Friga and Seater. Sunday, being dedicated to the sun, was called by them Sunandaeg; his idol represented the bust of a man, with the face darting bright rays, holding a wheel before his breast, indicative of the circuit of the golden orb around our sphere. Monday was dedicated to the moon, and was represented by a female on a pedestal, with a very singular dress and two long ears. Tuesday was dedicated to Tuisco, a German hero, sire of the Germans, Scythians and Saxons. He was represented as a venerable old man, with a long white beard, a scepter in his hand and the skin of a white bear thrown over his shoulders. Wednesday was consecrated to Woden, or Odin, a supreme god of the northern nations, father of the gods, god of war, of Mars. He was represented as a warrior in a bold martial attitude, clad in armor, holding in his right hand a broad, crooked sword and a shield in his left. Thursday was consecrated to Thor, eldest son of Woden, who was the Roman Jupiter. He was believed to govern the air, preside over lightning and thunder, direct the wind, rain and seasons. He was represented as sitting on a splendid throne, with a crown of gold adorned with twelve glittering stars, and a scepter in his right hand. Friday, or Friga, Hertha or Edith, was the mother of the gods and wife of



## THE MAYFLOWER'S PASSENGERS.

Woden. She was the goddess of love and pleasure and was portrayed as a female with a naked sword in her right hand and bow in her left hand, implying that in extreme cases women should fight as well as men. Saturday, or Seater, is the same as the Roman Saturnus. He was represented on a pedestal, standing on the back of a prickly fish called a perch, his head bare, with a thin, meager face. In his left hand he held a wheel and in his right a pail of water with fruits and flowers. The sharp fins of the fish implied that the worshipers of Seater should pass safely through every difficulty. The wheel was emblematic of their unity and freedom, and the pail of water implied that he could water the earth and make it more beautiful.

### The Mayflower's Passengers.

The following is a true list of the male passengers landed at Plymouth in the Mayflower :

Isaac Allerton.	Francis Eaton.	John Goodman.
Jno. Alden.	Thomas English.	Richard Gardiner.
Jno. Allerton.	Samuel Fuller.	George Soule.
William Bradford.	John Howland.	Capt. Miles Standish.
William Brewster.	Stephen Hopkins.	Edward Tilly.
John Billington.	Edward Leister.	John Tilly.
Peter Brown.	Christopher Martin.	Thomas Tinker.
Richard Brittridge.	William Mullins.	John Turner.
John Carver.	Edmund Margeson.	Edward Winslow.
Francis Cook.	Degony Priest.	William White.
James Chilton.	Thomas Rogers.	Richard Warren.
John Crackston.	John Rigdale.	Thomas Williams.
Richard Clarke.	Edward Fuller.	Gilbert Winslow.
Edward Dotey.	Moses Fletcher.	





Servants as follows :

Carter.	Hooke.	More.	Thompson.
Cooper.	Langmore.	Power.	Trevore.
Ely.	Latham.	Sampson.	Wilder.
Holbeck.	Minter.	Story.	

THE great Egyptian obelisk in Central Park, New York, is one of the most noted monoliths in the world. It was quarried, carved and erected about the time of Abraham to commemorate the deeds of an ancient Pharaoh. Five hundred years later the conquering Sesostri, the bad Pharaoh of Scripture, carved on its surface the record of his famous reign. The royal cartouch (or oval) shows that the work was done under the immediate order and sanction of the king. But Sesostri (or Rameses II.) reigned one hundred years before the Trojan war; so all the symbols now seen on Cleopatra's Needle were already venerable with age in the days of Priam, Hector, Helen, Agamemnon, Achilles and Ulysses. The Roman poet Horace says there were brave men before Agamemnon, but they lacked a Homer to save their names from oblivion. Sesostri, however, was an exception. He escaped oblivion without the aid of a Homer. Homer's heroes are to be congratulated above all men on having their story sung by such a minstrel; but with this thought there always goes a little doubt as to whether there ever were such heroes and such deeds outside of Homer's imagination. The hard granite of the Egyptian mountains leaves no doubt that Sesostri lived and reigned.

# WIND AND WEATHER SIGNALS.

ON March 1, 1887, a new system of weather signals was introduced by the United States Signal Office of the War Department, and has since been in use at all the stations of the service. The flags adopted for this purpose are four in number, and of the form and dimensions indicated below:

<p><i>No. 1. White Flag.</i></p>  <p><i>Clear or fair weather.</i></p>	<p><i>No. 2. Blue Flag.</i></p>  <p><i>Rain or snow.</i></p>	<p><i>No. 3. Black Triangular Flag.</i></p>  <p><i>Temperature signal.</i></p>	<p><i>No. 4. White Flag with black square in center.</i></p>  <p><i>Cold wave.</i></p>
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Number 1, white flag, six feet square, indicates clear or fair weather. Number 2, blue flag, six feet square, indicates rain or snow. Number 3, black triangular flag, four feet at the base and six feet in length, always refers to temperature; when placed above numbers 1 or 2 it indicates warmer weather; when placed below numbers 1 or 2 it indicates colder weather; when not displayed, the indications are

that the temperature will remain stationary, or that the change in temperature will not vary five degrees from the temperature of the same hour of the preceding day. Number 4, white flag, six feet square, with black square in center, indicates the approach of a sudden and decided fall in temperature. This signal is usually ordered at least twenty-four hours in advance of the cold wave. It is not displayed unless a temperature of forty-five degrees, or lower, is expected. When number 4 is displayed, number 3 is always omitted.

When displayed on poles, the signals are arranged to read downward; when displayed from horizontal supports, a small streamer is attached to indicate the point from which the signals are to be read.

## Interpretation of Displays.

No. 1, alone, indicates fair weather, stationary temperature.

No. 2, alone, indicates rain or snow, stationary temperature.

No. 1, with No. 3 below it, indicates fair weather, colder.

No. 2, with No. 3 above it, indicates warmer

weather, rain or snow.


No. 1, with No. 4 below it, indicates fair weather, cold wave.

No. 3, with Nos. 1 and 2 below it, indicates warmer, fair weather, followed by rain or snow.

## Storm, Cautionary and Wind-Direction Signals.


A red flag with a black center indicates that the storm is expected to be of marked violence. A yellow flag with a white center indicates that the winds expected will not be so severe, but well-founded; seaworthy vessels can meet them without danger. The red pennant indicates easterly winds; that is, from the north-east to south inclusive, and that generally the storm center is approaching. If

**EXAMPLE.**



*Cold wave, followed by rain or snow, succeeded by fair weather; colder.*





**EXAMPLE.**



*Warmer, fair weather, followed by rain or snow.*

## WIND AND WEATHER SIGNALS.

*above* cautionary or storm-signal, winds from northeast quadrant are more probable; *below*, winds from southeast quadrant. The white pennant indicates westerly winds; that is, from *north* to southwest inclusive, and that generally the storm center has passed. If *above* cautionary or storm-signal, winds from northeast quadrant are more probable; if *below*, winds from southwest quadrant.

<i>Red, Black Center.</i>	<i>Yellow, White Center.</i>	<i>Red Pennant.</i>	<i>White Pennant.</i>
			
<i>Storm.</i>	<i>Cautionary.</i>	<i>Easterly winds.</i>	<i>Westerly Winds.</i>

### Time Difference Between the City of New York and the Principal Foreign Cities.

FASTER THAN N. Y.		SLOWER THAN N. Y.	
H. M.	H. M.	H. M.	H. M.
Antwerp..... 5 13	Dublin..... 4 31	Melbourne.... 9 14	Canton..... 11 31
Berlin..... 5 50	Edinburgh.. 4 43	Paris..... 5 02	Havana..... 33
Bremen..... 5 31	Geneva..... 5 21	Rio de Janeiro 2 03	Hong Kong... 11 27
Brussels..... 5 14	Hamburg... 5 36	Rome..... 5 46	Mexico, City of 1 40
Buenos Ayres. 1 02	Liverpool... 4 44	St. Petersburg. 6 57	Panama..... 12
Calcutta..... 10 50	London.... 4 56	Valparaiso.... 10	Vera Cruz.... 1 29
Constantinople. 6 53	Madrid..... 4 42	Vienna..... 6 01	Yokohama.... 10 45

Actual New York mean time is given.

### The Climates of the United States.

Mean annual temperature, Fahrenheit, at places named.

Alabama.....	Mobile.....	66°	Mississippi.....	Jackson.....	64°
Alaska.....	Sitka.....	46	Missouri.....	St. Louis.....	55
Arizona.....	Tucson.....	69	Montana.....	Helena.....	43
Arkansas.....	Little Rock..	63	Nebraska.....	Omaha.....	49
California.....	San Francisco..	55	Nevada.....	C'p Win'ld Scott	50
Colorado.....	Denver.....	48	New Hampshire	Concord.....	46
Connecticut.....	Hartford.....	50	New Jersey.....	Trenton.....	53
Dakota.....	Fort Randall..	47	New Mexico....	Santa Fe.....	51
Delaware.....	Willmington..	53	New York.....	Albany.....	48
Dist. Columbia..	Washington... 55		North Carolina..	Raleigh.....	59
Florida.....	Jacksonville..	69	Ohio.....	Columbus....	53
Georgia.....	Atlanta.....	58	Oregon.....	Portland.....	53
Idaho.....	Fort Boise....	52	Pennsylvania...	Harrisburg...	54
Illinois.....	Springfield..	50	Rhode Island...	Providence....	48
Indiana.....	Indianapolis..	51	South Carolina..	Columbia.....	63
Indiana Territory.	Fort Gibson... 60		Tennessee.....	Nashville....	58
Iowa.....	Des Moines....	49	Texas.....	Austin.....	67
Kansas.....	Leavenworth..	51	Utah.....	Salt Lake City..	52
Kentucky.....	Louisville....	56	Vermont.....	Montpelier....	43
Louisiana.....	New Orleans... 69		Virginia.....	Richmond.....	57
Maine.....	Augusta.....	45	Washington T...	Steilacoom....	51
Maryland.....	Baltimore....	54	West Virginia...	Romney.....	52
Massachusetts...	Boston.....	48	Wisconsin.....	Madison.....	45
Michigan.....	Detroit.....	47	Wyoming.....	Fort Bridger...	41
Minnesota.....	St. Paul.....	42			

## THE LANGUAGE OF FLOWERS.

A cluster of flowers can be made to express any sentiment, if care is taken in the selection.

If a flower is offered *reversed*, its original signification is contradicted, and the opposite implied.

A rosebud divested of its thorns, but retaining its leaves, conveys the sentiment, "I fear no longer; I hope." Stripped of leaves and thorns, it signifies, "There is nothing to hope or fear."

A full-blown rose, placed over two buds, signifies "Secrecy."

"Yes" is implied by touching the flower given to the lips; "No," by pinching off a petal and casting it away.

"I am" is expressed by a laurel leaf twined around the bouquet; "I have," by an ivy leaf folded together; "I offer you," by a leaf of Virginia creeper.

### COMBINATIONS.

Moss Rosebud,	{ A confession
Myrtle,	{ of love.
Mignonette,	{ Your qualities surpass your charms
Colored Daisy,	{ of beauty.
Lily of the Valley,	{ Your unconscious sweetness
Ferns,	{ has fascinated me.
Yellow Rose,	{ Your jealousy
Broken Straw,	{ has broken
Ivy,	{ our friendship.
Scarlet Geranium,	{ I trust you will find consolation,
Passion Flower,	{ through faith,
Purple Hyacinth,	{ in your sorrow;
Arbor Vitæ,	{ be assured of my unchanging friendship.
Columbine,	{ Your folly and
Day Lily,	{ coquetry have
Broken Straw,	{ broken
Witch Hazel,	{ the spell of your
Colored Daisy,	{ beauty.
White Pink,	{ Your talent
Canary Grass,	{ and perseverance
Laurel,	{ will win you glory.
Golden-rod,	{ Be cautious;
Monkshead,	{ danger is near;
Sweet Pea,	{ I depart soon;
Forget-me-not,	{ forget me not.
Arbor Vitæ.—Unchanging friendship.	Geranium, Rose.—Preference.
Camellia, White.—Loveliness.	Golden-rod.—Be cautious.
Candy-Tuft.—Indifference.	Heliotrope.—Devotion.
Carnation, White.—Disdain.	Hyacinth, White.—Loveliness.
China Aster.—Variety.	Hyacinth, Purple.—Sorrow.
Clover, Four-Leaf.—Be mine.	Ivy.—Friendship.
Clover, White.—Think of me.	Lily, Day.—Coquetry.
Clover, Red.—Industry.	Lily, White.—Sweetness.
Columbine.—Folly.	Lily, Yellow.—Gayety.
Daisy.—Innocence.	Lily, Water.—Purity of heart; elegance.
Daisy, Colored.—Beauty.	Lily of the Valley.—Unconscious sweetness.
Dead Leaves.—Sadness.	Mignonette.—Your qualities surpass
Deadly Nightshade.—Falsehood.	your charms.
Fern.—Fascination.	Monkshead.—Danger is near.
Forget-me-not.	Myrtle.—Love.
Fuchsia, Scarlet.—Taste.	Oak.—Hospitality.
Geranium, Horseshoe.—Stupidity.	Orange Blossoms.—Chastity.
Geranium, Scarlet.—Consolation.	

## THE LANGUAGE OF GEMS.

Pansy.—Thoughts.  
 Passion Flower.—Faith.  
 Primrose.—Inconstancy.  
 Rose.—Love  
 Rose, Damask.—Beauty ever new.  
 Rose, Yellow.—Jealousy  
 Rose, White.—I am worthy of you.  
 Rosebud, Moss.—Confession of love.  
 Smilax.—Constasy.

Straw.—Agreement.  
 Straw, Broken.—Broken agreement.  
 Sweet Pea.—Depart.  
 Tuberose.—Dangerous pleasures.  
 Thistle.—Sternness.  
 Verbena.—Pray for me.  
 White Jasmine.—Amiability.  
 Witch Hazel.—A spell.

## THE LANGUAGE OF GEMS.

**AMETHYST.**—Peace of mind. Regarded by the ancients as having the power to dispel drunkenness.

**BLOODSTONE.**—I mourn your absence. Worn by the ancients as an amulet or charm, on account of the medicinal and magical virtues it was supposed to possess.

**DIAMOND.**—Pride. Awarded supernatural qualities from the most remote period down to the Middle Ages. Has the power of making men courageous and magnanimous. Protects from evil spirits. Influences the gods to take pity upon mortals. Maintains concord between husband and wife, and for this reason was held as the most appropriate stone for the espousal ring.

**EMERALD.**—Success in love. Mentioned in the Bible as worn in the breast-plate of the High Priest as an emblem of chastity.

**RUBY.**—A cheerful mind. An amulet against poison, sadness, evil thoughts. A preservative of health. Admonishes the wearer of impending danger by changing color.

**SAPPHIRE.**—Chastity. Procures favor with princes. Frees from enchantment. Prevents impure thoughts.

**TOPAZ.**—Fidelity. Calms the passions. [tagion.

**TURQUOISE.**—Success and happiness. Preserves from con-

**GARNET.**—Fidelity in every engagement. Onyx.—Reciprocal love. Opal.—Pure thoughts. Pearl.—Purity and innocence.

**MAKING BLACKBOARDS.**—The following directions for this work are given us by an experienced superintendent: The first care must be to make the wall surface or boards to be blacked perfectly smooth. Fill all the holes and cracks with plaster of Paris mixed with water; mix but little at a time; press in and smooth down with a case knife. The cracks between shrunken boards may be filled in the same way. Afterward use sandpaper. The ingredients needed for slating are (1) liquid gum shellac, sometimes called shellac varnish; (2) lampblack or drop black. Gum shellac is cut in alcohol, and the liquid can be obtained of any druggist. Pour some shellac into an open dish, and stir in lampblack to make a heavy paint. With a clean brush, spread on any kind of surface but glass. Put on a little and test it. If it is glossy and the chalk slips over it, reduce the mixture with alcohol. Alcohol can be bought of any druggist. If it rubs off, let the druggist put in more gum to make the liquid thicker. One quart of the liquid and a 5 cent paper of lampblack are sufficient to slate all the blackboards in any country school with two coats.

**HOW TO POLISH HORNS.**—First boil the horn to remove the pith, if it has been freshly taken from the animal. If it is an old, dry horn, the pith may be dried out, and boiling is not necessary; but it may be laid in hot water for a short time to make it soft. Then scrape off all the roughnesses with a coarse file, a knife or a piece of glass. When the rough spots are removed rub around the horn with coarse sandpaper, then with a finer kind. After this, rub the horn lengthwise with a flannel cloth which has been dipped in powdered pumice-stone or rotten stone, and moistened in linseed oil. This rubbing should continue till all the sandpaper marks are removed, then give a final rubbing with a clean flannel cloth, and lastly, with a piece of tissue paper.

# THE WONDERS OF ELECTRICITY.

**THE TELEPHONE.**—The principle of the telephone, that sounds could be conveyed to a distance by a distended wire, was demonstrated by Robert Hook in 1667, but no practical application was made of the discovery until 1821, when Professor Wheatstone exhibited his "Enchanted Lyre," in which the sounds of a music box were conveyed from a cellar to upper rooms. The first true discoverer of the speaking telephone, however, was Johann Philipp Reis, a German scientist and professor in the institute of Friedrichsdorf. April 25, 1861, Reis exhibited his telephone at Frankfort. This contained all the essential features of the modern telephone, but as its commercial value was not at all comprehended, little attention was paid to it. Reis, after trying in vain to arouse the interest of scientists in his discovery, died in 1874, without having reaped any advantage from it, and there is no doubt that his death was hastened by the distress of mind caused by his continual rebuffs. Meanwhile, the idea was being worked into more practical shape by other persons, Professor Elisha Gray and Professor A.G. Bell, and later by Mr. Edison. There is little doubt that Professor Gray's successful experiments considerably antedated those of the others, but Professor Bell was the first to perfect his patent. February 12, 1877, Bell's articulating telephone was tested by experiments at Boston and Salem, Mass., and was found to convey sounds distinctly from one place to the other, a distance of eighteen miles. This telephone was exhibited widely in this country and in Europe during that year, and telephone companies were established to bring it into general use. Edison's carbon "loud-speaking" telephone was brought out in 1878. It is not worth while to go into details on the subject of priority of invention. The Examiner of Patents at Washington, July 21, 1883, decided that Professor Bell was the first inventor, because he was the first to complete his invention and secure a full patent. Since 1878 there have been many improvements in the different parts of the telephone, rendering it now nearly perfect in its working.

**THE PHONOGRAPH.**—The principle of the phonograph is very simple. All sound is produced by vibrations of the air. Therefore, any sound whatever can be reproduced by reproducing its vibrations. The phonograph is regarded as one of the wonders of the nineteenth century, and yet its foundation principle is as readily understood as the multiplication table, and its construction is simplicity itself. A small brass cylinder is made to turn on a metal shaft, and upon its surface is cut a spiral groove, corresponding to threads cut on the shaft. Over the cylinder is spread a sheet of tin foil, secured on its edges by some highly adhering substance. A crank attached to the shaft turns the cylinder, giving it at the same time a rotary and a horizontal motion. In front of the cylinder is a mouthpiece, having on its bottom (next the cylinder) a very thin plate or diaphragm of metal, to which is attached a round steel point. Before using the apparatus the steel point must be accurately adjusted opposite to that part of the foil lying over the spiral groove. If the lips are now applied to the mouthpiece and any sentence spoken, the crank at the same time being turned, the vibrations imparted to the metal plate by the voice will cause the steel point to come into contact with that part of the foil overlying the groove and to make on it a series of indentations as it revolves and is carried forward laterally before the mouthpiece. These indentations vary in depth and sectional outline according to the force and kind of vibrations made, and are in fact a transcription of the sounds. They are then translated by bringing the cylinder back to its starting-point and substituting for the mouthpiece a resonator. The steel is then held by a screw close to the foil, and as the cylinder moves the point retraces the indentations from beginning to end and communicates to the metal diaphragm the same vibrations which it had received from it, and these vibrations, communicated to the resonating apparatus, are reproduced as spoken words. If the crank is turned with exact regularity the exact pitch and tone of the speaker's voice will also be given back. The phonograph was invented by Mr. Edison in 1877 and brought before the public early in the following year. The inventor believed that the numerous practical applications of this machine would commend it very largely to general use. This has not thus far proved to be the case, not because the instrument itself is lacking, for added experiment only proves its more remarkable possibilities, but probably because the invention is so wholly new and strange, so at variance with anything previously known and understood, that men have not yet been able to comprehend its application to everyday affairs.

## THE WONDERS OF ELECTRICITY.

**THE GRAPHOPHONE.**—This invention is the work of Mr. Sumner Taintor, aided by Professor Bell, the telephone inventor. The machine is operated on the principle of the phonograph. It is very simple and is free from mechanical complication. It has a treadle, and it looks very much like a small sewing-machine. Edison discovered the art of recording and reproducing sound, but his invention could not be used because of its clumsy mechanical arrangement, coupled with the very inferior and unsatisfactory methods of recording the sounds produced. He used a piece of tinfoil upon which the sound waves were indented and from which they were easily obliterated. The present inventor, Mr. Taintor, saw that a less destructible material was required, and after considerable experiment tried a preparation of wax and paraffine. This is the surface now used, and it works perfectly. He then made an entirely new apparatus, and the result is the graphophone, a machine which will sing a song, report a whistle, or give the quality and inflections of the voice in a most charming way. The small point which is attached to the diaphragm of the machine cuts a minute hair line in the wax surface. This line is so faint that it is scarcely perceptible to the naked eye, yet it serves to give a reproduction, so as to be distinctly heard by the listener, of a song, a laugh, or an ordinary speech.

**THE ELECTRIC RAILWAY.**—Electricity may be applied to the propulsion of cars in two different ways. In one case the current is supplied to the electro motors from storage batteries carried by the cars. This method requires no change in the ordinary roadbed used by the steam railway, but no means have yet been invented for making or operating economically the storage battery required. In the second case the current is supplied to the motors on moving trains from stations along the line of road through properly placed conductors. The method requires a peculiar construction of the road throughout with reference to the necessary electrical conditions. Several different forms of the electric railway are possible, depending on the method by which the current is conducted to the motors. By one method the two rails are used as conductors, the current going out by one rail and returning by the other, and passing to the electro-motors through the wheels of the train, which are insulated. There is much leakage or loss of power in this method, however, and its inventors have essayed to overcome by using a third rail or conductor for the outgoing current, utilizing both rails for its return. We will briefly describe the method of working the Siemens electric railway, which has been applied successfully to several short railway lines in Europe. The longest of these lines is that between Portrush and Bushmills, in the north of Ireland, which is six miles long. The line is a three-foot gauge, single track, laid at one side of the country road. The third rail, or conductor, is placed beside the roadbed, 17 inches above the ground. It is a T-rail carried upon insulator posts. The current is conveyed by the conductor to the car by means of two steel springs, one at each end. Wherever the railway crosses roads the conductor is carried underground. The current from the conducting rail passes through the car to the return rails by a switch worked by a lever—with which resistance coils can be placed in or out of circuit—then through the electro-motor to the wheels by which it reaches the rails. The motor is placed in the center of the car, beneath the floor, being connected with the axle of one pair of wheels by gearing. The reversing and brake levers are placed at each end of the car, so that it can be operated from either end. The rails of the track are laid in the usual manner, and are connected with the strips of copper to insure good electrical contact. In the Edison and Field railway, which was exhibited at the Chicago Exhibition of Railway Appliances, the same general plan was observed, but the conductor was placed between the two other rails, and the current was conveyed from this rail to the car through stiff wire brushes pressing on each side of the rail. These were operated by a lever reaching down from the car. This track was 1,553 feet in length.

**THE ELECTRIC LIGHT.**—Setting aside natural phenomena, as the lightning and St. Elmo's fire, and all mere experiments with the electric spark, the first inventor of the electric light was Sir Humphrey Davy, who in the early part of the century produced the arc light with a battery of 2,000 cells. The mode of producing this light is as follows: When the terminal wires of an electric battery

## THE ELECTRIC LIGHT.

are brought together and then separated slightly an intense, bright light between them results, and this, because of its curved form, is called the electric arc. This light, in temperature as well as brightness, exceeds all other artificial sources of heat, by its means the hardest substances, even the diamond, being entirely consumed. The wires of the battery in this light melt and drop off in globules, but it was found that hard carbon points on the wires would prevent this, as well as increase the intensity of the light. Davy used pieces of charcoal. Foucault, in his experiments in 1844, used carbon from the retorts of gas-works, which is much harder. Foucault's improvement led to the first practical use of the electric light. It was used to illuminate the Place de la Concorde, in Paris, being placed on the knee of one of the statues there, and amazing all beholders with its brilliant power. The carbon points, though not destroyed as rapidly as wire, yet of course must waste in the consuming heat of the light. In time the distance between them is increased until the light is interrupted, and they must be brought together again to renew the illumination. Thomas Wright, of London, invented the first apparatus for moving the points automatically toward each other, a feature which now belongs to several forms of electric lighting. As it has been found that the positive carbon wastes more rapidly than the negative, that point is made to move over a wider space than the other in the same interval of time.

In 1855 Jules Dubosq's electric lamp—thus far the most perfect of the kind—was shown at the Paris Exhibition, and Professor Tyndall, of England, adopted it for the illustration of his lectures on light and colors. In 1858 the works of the new Westminster bridge, London, were illuminated by Watson's electric light, and the following year the magneto-electric light, invented by Professor Holmes, was successfully tried at the lighthouse at Dover. In 1861 the French Government provided for the illumination of eight coast light-houses by the electric light. But, though improvements were made in the invention during the fifteen years following, little was accomplished toward practical electric lighting until the invention of Jablochhoff's candle. Paul Jablochhoff was a Russian, who for his scientific knowledge and skill had been appointed director of telegraph lines between Moscow and Kursk. He resigned this post in 1875, desiring to devote his time wholly to scientific study. He intended to visit the Centennial Exhibition in this country in 1876, but on his way hither stopped in Paris, where a noted chemist induced him to remain by placing a large laboratory at his disposal. Here a few months later he produced the electric candle, whose discovery made a great sensation. This consisted of two carbons placed side by side, separated and encased in an insulating and fusible substance. As the carbons wasted the fusible substance was also consumed. The light given by this candle was soft and steady, and a large number of them speedily came into use in Europe. It was quite overshadowed in importance, however, by the incandescent lamp, which was first invented about 1870. The different kinds of electric lights now in use may be divided into five groups, thus: 1. Glow lamps or incandescent lamps, in which the light is produced by a bad conductor in an uninterrupted circuit, the conductor itself being not directly consumed. 2. Mixed or semi-incandescent lamps, in which the light is produced at the place of contact between two conductors, one of them being consumed more or less rapidly. 3. Regulated lamps, in which the light is formed by the voltaic arc, and the distance of the carbons is continually regulated by clockwork or other means. 4. Electric candles, having the carbons parallel, as above described. In each of these groups a series of different lamps have been invented, differing somewhat in details of construction. Thus we have, in the incandescent lamps, the Swan lamp, the Maxim lamp, the Edison lamp, the Siemens lamp, and others. We may briefly describe the Edison as a type of the class. In this bamboo fiber is used for the carbon filament, and this is attached to platinum wire. By means of machinery the bamboo is divided into small fibers, and pressed in U-shaped moulds, then put into ovens, where they are allowed to become carbonized. They are then attached to the platinum wire and fused in a glass stopper. A glass tube is now blown into a bulb, the stopper is placed in it, and both bulb and stopper are fused together. The bulb is then exhausted of its air—for the electric light requires a vacuum for its brilliancy—and the opening at its apex is closed by fusing. The platinum wires of the lamp are connected with the copper wires from a battery, and the lamp is ready for use. A very simple contrivance for breaking the current by turning a



## STORAGE OF ELECTRICITY.

key serves to ignite or extinguish the lamps. Each lamp is guaranteed to burn 800 hours; after about that period both the platinum and the carbon are exhausted by slow combustion, and a new lamp must be fitted on. The principal difference between the incandescent lamps is in the preparation of the carbon filament. Those for the Swan lamp are made from cotton fibers soaked in sulphuric acid, then packed in fine coal-dust, and exposed to heat. The Maxim lamp filaments are prepared from Bristol paper; those of the Lane-Fox lamp from hemp and coke; those of the Bernstein lamp—one of the most brilliant made—are of silk carbonized in coal-dust. The half-incandescent lamps are quite a recent invention, the first being made in 1878. In these the light arises at the point of contact, and the essential features of the plan consist of a pencil of carbon pressed against a carbon block; as its point is consumed the pencil is pushed forward, thus rendering the light continuous. Some eight or nine different lamps have been invented on this plan. The regulated arc lamps include an even larger number of patents, of which the best known in this country is the Brush light. The lights in all these are formed between the points of the carbon rods, and the details of clockwork for moving forward the rods as they are consumed are too technical for description. Still another style of electric lamp has the carbons inclined at an angle to each other, and some very successful lamps, as the Soleil, have been made on this plan. It might be here noted that the great impetus given to the electric light by the work of Mr Edison was not so much in improving the lamp as in cheapening the process of generating the electricity, and inventing a ready mode of dividing the light. Hitherto the expense attendant upon the production of the electric force, and the difficulty of using it simultaneously at a large number of illuminating points, had been the two principal barriers in the way of applying the electric light to public use.

**STORAGE OF ELECTRICITY.**—It must be noted, to begin with, that the term "storing electricity" conveys, usually, an altogether erroneous idea to the uninitiated. They are apt to conceive of it as pouring electricity into some receptacle, as we pour oil into a lamp, to be used when needed. But, in fact, electricity is an energy, not a substance, and therefore is not capable of storage, in the ordinary sense. What is really done by the "storage" apparatus is to convert electricity into chemical energy, under such circumstances that, by proper arrangements, it may be readily converted back into electricity. The secondary batteries used for the storing purpose are more correctly termed accumulators. The first battery of this kind was made by Ritter about 1840, and it consisted of a series of disks of a single metal, alternated with cloth or card moistened in a liquid by which the metal would not be affected chemically. In 1859 Mr. Gaston Plante made a secondary battery, for which he used plates of lead, instead of plates of platinum. Passing a current through these, lead oxide was deposited, and after the charging current was removed, the lead and lead oxide were found to yield a very slight current. To increase this Plante devised the plan of first charging the plates, then discharging, then charging again with the battery current reversed, and so on, until, by repeated oxidations and subsequent reductions of the oxidized material, very porous plates were made. These, by their porosity, exposed a large surface to the oxidizing action of the current, so that a small porous plate took up as much electricity as one of large superficial area. Plante found that by connecting a number of cells together, and after charging them, arranging them in series, that is, the positive plate of one connected with the negative plate of another, and so on, he could store for use quite powerful currents of electricity. In 1880 another electrician, M. Camille Faure, devised the plan of coating Plante's lead plates with red lead, and then encasing them in flannel. The advantage of the red lead is that it is very quickly made porous, and therefore the process of repeated charging of the plates, known as the "forming" process, was reduced from weeks to days, and even to hours. This discovery, by reducing the time and expense of making the secondary battery, gave it a commercial value that it never had before, and it was hailed as a great advantage. Since that time a number of patents have been obtained for storage batteries, and they now exist in different forms, but generally modeled on the inventions of Plante and Faure. The efforts of inventors have been mainly directed toward reducing the weight of the cells and to devising new ways of holding the red lead on the plates. This last-named substance, becoming porous, drops off readily, and for

## ELECTRICAL TERMS.

this reason the encasements of flannel, etc., were first devised. In some of the storage batteries, a plate, or frame, of cast lead is used, with receptacles, cells, etc., which are filled with the red lead.

**ELECTRICAL TERMS.**—The technical terms used in regard to electricity refer to units of various nature. Thus the unit of capacity is one farad; the unit of activity, one watt; the unit of work one joule; the unit of quantity, one coulomb; the unit of current, one ampere; the unit of resistance, one ohm; the unit of magnetic field, one gauss; the unit of pressure, one volt; the unit of force, one dyne. The names are mostly derived from the names of men that have been famous in the field of electrical research. Thus Michael Faraday, James Watt and James P. Joule, famous English discoverers, give their names to the first three units mentioned; Charles A. Coulomb and Andre M. Ampere, French inventors, to the two units following; G. S. Ohm and Carl F. Gauss, Germans, name two more units; and the volt is named from the Italian discoverer, Volta. The dyne is derived from the root word of dynamo, itself meaning force.

**PRESERVING WOOD.**—There have been a number of processes patented for preserving wood. One of them, very generally used, consists in immersing the timber in a bath of corrosive sublimate. Another process consists in first filling the pores with a solution of chloride of calcium under pressure, and next forcing in a solution of sulphate of iron, by which an insoluble sulphate of lime is formed in the body of the wood, which is thus rendered nearly as hard as stone. Wood prepared in this way is now very largely used for railroad ties. Another process consists in impregnating the wood with a solution of chloride of zinc. Yet another way is to thoroughly impregnate the timber with oil of tar containing creosote and a crude solution of acetate of iron. The process consists in putting the wood in a cylindrical vessel, connected with a powerful air pump. The air is withdrawn, and the liquid subjected to pressure, so that as much of it as possible is forced into the pores of the wood. The processes above given not only season the timber so that it is not subject to dry rot, but also keep it from being injured by the weather, or being attacked by insects or worms.

**TO MAKE CLOTH WATERPROOF.**—There have been various devices for rendering cloth waterproof without the use of India rubber. The most successful of these, no doubt, is the Stenhouse patent. This consists of the application of paraffine combined with drying oil. Paraffine was first used alone, but it was found to harden and break off from the cloth after a time. When drying oil was added, however, even in a very small quantity, it was found that the two substances, by the absorption of oxygen, became converted into a tenacious substance very like resin. To apply this the paraffine is melted with drying oil, and then cast into blocks. The composition can then be applied to fabrics by rubbing them over with a block of it, either cold or gently warmed. Or the melted mixture may be applied with a brush and the cloth then passed through hot rollers in order to cover its entire substance perfectly. This application makes cloth very repellant to water, though still pervious to air.

**THE RULE OF THE ROAD.**—The "rule of the road" in the United States is "turn to the right;" in England it is the reverse. The rule holds in this country in the case where two vehicles going in opposite directions meet. When one vehicle overtakes another the foremost gives way to the left and the other passes by on the "off side;" and when a vehicle is crossing the direction of another it keeps to the left and crosses in its rear. These two rules are the same in this country and in England, and why the rule concerning meeting vehicles should have been changed it is impossible to say. We find this point of difference noted by all authorities, but no reason for it is ever suggested. Probably, as it is easier to turn to the right than to the left, it was adopted as the more preferable custom in some of the early colonies, and in due time became embodied in local law, and thus was handed down to later times.

**PIANO POLISH.**—Take equal proportions of turpentine, linseed oil and vinegar. Mix; rub in well with a piece of flannel cloth. Then polish with a piece of chamois skin. This treatment will entirely remove the dingy appearance that age gives to fine woods.

## NAMES AND THEIR MEANING.

### CHRISTIAN NAMES OF MEN.

- Aaron, *Hebrew*, a mountain, or lofty.  
 Abel, *Hebrew*, vanity.  
 Abraham, *Hebrew*, the father of many.  
 Absalom, *Hebrew*, the father of peace.  
 Adam, *Hebrew*, red earth.  
 Adolphus, *Saxon*, happiness and help.  
 Adrian, *Latin*, one who helps.  
 Alan, *Celtic*, harmony; or *Slavonic*, a hound.  
 Albert, *Saxon*, all bright.  
 Alexander, *Greek*, a helper of men.  
 Alfred, *Saxon*, all peace.  
 Alonzo, form of Alphonso, *g. v.*  
 Alphonso, *German*, ready or willing.  
 Ambrose, *Greek*, immortal.  
 Amos, *Hebrew*, a burden.  
 Andrew, *Greek*, courageous.  
 Anthony, *Latin*, flourishing.  
 Archibald, *German*, a bold observer.  
 Arnold, *German*, a maintainer of honor.  
 Arthur, *British*, a strong man.  
 Augustus, } *Latin*, venerable, grand.  
 Augustin, }  
 Baldwin, *German*, a bold winner.  
 Bardulph, *German*, a famous helper.  
 Barnaby, *Hebrew*, a prophet's son.  
 Bartholomew, *Hebrew*, the son of him who made the waters to rise.  
 Beaumont, *French*, a pretty mount.  
 Bede, *Saxon*, prayer.  
 Benjamin, *Hebrew*, the son of a right hand.  
 Bennet *Latin*, blessed.  
 Bernard, *German*, bear's heart.  
 Bertram, *German*, fair, illustrious.  
 Bertrand, *German*, bright raven.  
 Boniface, *Latin*, a well doer.  
 Brian, *French*, having a thundering voice.  
 Cadwallader, *British*, valiant in war.  
 Cæsar, *Latin*, adorned with hair.  
 Caleb, *Hebrew*, a dog.  
 Cecil, *Latin*, dim-sighted.  
 Charles, *German*, noble-spirited.  
 Christopher, *Greek*, bearing Christ.  
 Clement, *Latin*, mild tempered.  
 Conrad, *German*, able counsel.  
 Constantine, *Latin*, resolute.  
 Cornelius, *Latin*, meaning uncertain.  
 Crispin, *Latin*, having curled locks.  
 Cuthbert, *Saxon*, known famously.  
 Dan, *Hebrew*, judgment.  
 Daniel, *Hebrew*, God is judge.  
 David, *Hebrew*, well-beloved.  
 Denis, *Greek*, belonging to the God of wine.  
 Douglas, *Gaelic*, dark gray.  
 Duncan, *Saxon*, brown chief.  
 Dunstan, *Saxon*, most high.  
 Edgar, *Saxon*, happy honor.  
 Edmund, *Saxon*, happy peace.  
 Edward, *Saxon*, happy keeper.  
 Edwin, *Saxon*, happy conqueror.  
 Egbert, *Saxon*, ever bright.  
 Elijah, *Hebrew*, God the Lord.  
 Elisha, *Hebrew*, the salvation of God.  
 Emmanuel, *Hebrew*, God with us.  
 Enoch, *Hebrew*, dedicated.  
 Ephraim, *Hebrew*, fruitful.  
 Erasmus, *Greek*, lovely, worthy to be loved.  
 Ernest, *Greek*, earnest, serious.  
 Esau, *Hebrew*, hairy.  
 Eugene, *Greek*, noble, descended.  
 Eustace, *Greek*, standing firm.  
 Evan, or Ivan, *British*, the same as John.  
 Everard, *German*, well reported.  
 Ezekiel, *Hebrew*, the strength of God.  
 Felix, *Latin*, happy.  
 Ferdinand, *German*, pure peace.  
 Fergus, *Saxon*, manly strength.  
 Francis, *German*, free.  
 Frederic, *German*, rich peace.  
 Gabriel, *Hebrew*, the strength of God.  
 Goeffrey, *German*, joyful.  
 George, *Greek*, a husbandman.  
 Gerard, *Saxon*, all towardliness.  
 Gideon, *Hebrew*, a breaker.  
 Gilbert, *Saxon*, bright as gold.  
 Giles, *Greek*, a little goat.  
 Godard, *German*, a godly disposition.  
 Godfrey, *German*, God's peace.  
 Godwin, *German*, victorious in God.  
 Griffith, *British*, having great faith.  
 Guy, *French*, a leader.  
 Hannibal, *Punic*, a gracious lord.  
 Harold, *Saxon*, a champion.  
 Hector, *Greek*, a stout defender.  
 Henry, *German*, a rich lord.  
 Herbert, *German*, a bright lord.  
 Hercules, *Greek*, the glory of Hera, or Juno.  
 Hezekiah, *Hebrew*, cleaving to the Lord.  
 Horace, *Latin*, meaning uncertain.  
 Horatio, *Italian*, worthy to be beheld.  
 Howel, *British*, sound or whole.  
 Hubert, *German*, a bright color.  
 Hugh, *Dutch*, high, lofty.  
 Humphrey, *German*, domestic peace.  
 Ignatius, *Latin*, fiery.  
 Ingram, *German*, of angelic purity.  
 Isaac, *Hebrew*, laughter.  
 Iabez, *Hebrew*, one who causes pain.  
 Jacob, *Hebrew*, a supplanter.  
 James, or Jacques, beguiling.  
 Joab, *Hebrew*, fatherhood.  
 Job, *Hebrew*, sorrowing.  
 Joel, *Hebrew*, acquiescing.  
 John, *Hebrew*, the grace of the Lord.  
 Jonah, *Hebrew*, a dove.  
 Jonathan, *Hebrew*, the gift of the Lord.  
 Joscelin, *German*, just.

## NAMES AND THEIR MEANING.

Joseph, *Hebrew*, addition.  
 Joshua, *Hebrew*, a Saviour.  
 Josiah or Josais, *Hebrew*, the fire of the Lord.  
 Julius, *Latin*, soft haired. •  
 Lambert, *Saxon*, a fair lamb.  
 Lancelot, *Spanish*, a little lance.  
 Laurence, *Latin*, crowned with laurels.  
 Lazarus, *Hebrew*, destitute of help.  
 Leonard, *German*, like a lion.  
 Leopold, *German*, defending the people.  
 Lewis or Louis, *French*, the defender of the people.  
 Lionel, *Latin*, a little lion.  
 Llewellyn, *British*, like a lion.  
 Llewellyn, *Celtic*, lightning.  
 Lucius, *Latin*, shining.  
 Luke, *Greek*, a wood or grove.  
 Manfred, *German*, great peace.  
 Mark, *Latin*, a hammer.  
 Martin, *Latin*, martial.  
 Matthew, *Hebrew*, a gift or present.  
 Maurice, *Latin*, sprung of a Moor.  
 Meredith, *British*, the roaring of the sea.  
 Michael, *Hebrew*, who is like God?  
 Morgan, *British*, a mariner.  
 Moses, *Hebrew*, drawn out.  
 Nathaniel, *Hebrew*, the gift of God.  
 Neal, *French*, somewhat black.  
 Nicholas, *Greek*, victorious over the people.  
 Noel, *French*, belonging to one's nativity.  
 Norman, *French*, one born in Normandy.  
 Obadiah, *Hebrew*, the servant of the Lord.  
 Oliver, *Latin*, an olive.  
 Orlando, *Italian*, counsel for the land.  
 Orson, *Latin*, a bear.  
 O mund, *Saxon*, house peace.  
 Oswald, *Saxon*, ruler of a house.  
 Owen, *British*, well descended.  
 Patrick, *Latin*, a nobleman.  
 Paul, *Latin*, small, little.  
 Paulinus, *Latin*, little Paul.  
 Percival, *French*, a place in France.  
 Percy, *English*, adaptation of "pierce eye."  
 Peregrine, *Latin*, outlandish.  
 Peter, *Greek*, a rock or stone.  
 Philip, *Greek*, a lover of horses.  
 Phineas, *Hebrew*, of bold countenance.  
 Ralph, contracted from Randolph, or Randal, or Ranulph, *Saxon*, pure help.  
 Raymond, *German*, quiet peace.  
 Reuben, *Hebrew*, the son of vision.  
 Reynold, *German*, a lover of purity.  
 Richard, *Saxon*, powerful.  
 Robert, *German*, famous in counsel.  
 Roderick, *German*, rich in fame.  
 Roger, *German*, strong counsel,

Roland or Rowland, *German*, counsel for the land.  
 Rollo, form of Roland, *g. v.*  
 Rufus, *Latin*, reddish.  
 Samson, *Hebrew*, a little son.  
 Samuel, *Hebrew*, heard by God.  
 Saul, *Hebrew*, desired.  
 Sebastian, *Greek*, to be revered.  
 Seth, *Hebrew*, appointed.  
 Silas, *Latin*, sylvan or living in the woods.  
 Simeon, *Hebrew*, hearing.  
 Simon, *Hebrew*, obedient.  
 Solomon, *Hebrew*, peaceable.  
 Stephen, *Greek*, a crown or garland.  
 Swithin, *Saxon*, very high.  
 Theobald, *Saxon*, bold over the people.  
 Theodore, *Greek*, the gift of God.  
 Theodosius, *Greek*, given of God.  
 Theophilus, *Greek*, a lover of God.  
 Thomas, *Hebrew*, a twin.  
 Timothy, *Greek*, a fearer of God.  
 Titus, *Greek*, meaning uncertain.  
 Toby, or Tobias, *Hebrew*, the goodness of the Lord.  
 Valentine, *Latin*, powerful.  
 Victor, *Latin*, conqueror.  
 Vincent, *Latin*, conquering.  
 Vivian, *Latin*, living.  
 Walter, *German*, a conqueror.  
 Walwin, *German*, a conqueror.  
 Wilfred, *Saxon*, bold and peaceful.  
 William, *German*, defending many.  
 Zaccheus, *Syriac*, innocent.  
 Zachary, *Hebrew*, remembering the Lord.  
 Zebedee, *Syriac*, having an inheritance.  
 Zechariah, *Hebrew*, remembered of the Lord.  
 Zedekiah, *Hebrew*, the justice of the Lord.

### CHRISTIAN NAMES OF WOMEN.

Ada, *German*, same as Edith, *g. v.*  
 Adela, *German*, same as Adeline, *g. v.*  
 Adelaide, *German*, same as Adeline, *g. v.*  
 Adeline, *German*, a princess.  
 Agatha, *Greek*, good.  
 Agnes, *German*, chaste.  
 Alethea, *Greek*, the truth.  
 Althea, *Greek*, hunting.  
 Alice, Alicia, *German*, noble.  
 Alma, *Latin*, benignant.  
 Amabel, *Latin*, loveable.  
 Amy, Amelia, *French*, a beloved.  
 Angelina, *Greek*, lovely, angelic.  
 Anna, or Anne, *Hebrew*, gracious.  
 Arabella, *Latin*, a fair altar.  
 Aureola, *Latin*, like gold.  
 Aurora, *Latin*, morning brightness.  
 Barbara, *Latin*, foreign or strange.  
 Beatrice, *Latin*, making happy, [421

## NAMES AND THEIR MEANING.

- Bella, *Italian*, beautiful.  
 Benedicta, *Latin*, blessed.  
 Bernice, *Greek*, bringing victory.  
 Bertha, *Greek*, bright or famous.  
 Bessie, *short form of Elizabeth*, *q. v.*  
 Blanch, *French*, fair.  
 Bona, *Latin*, good.  
 Bridget, *Irish*, shining bright.  
 Camilla, *Lat. n.*, attendant at a sacrifice.  
 Carlotta, *Italian*, same as Charlotte, *q. v.*  
 Caroline, *feminine of Charles*, the *Latin* of Charles, noble spirited.  
 Cassandra, *Greek*, a reformer of men.  
 Catherine, *Greek*, pure or clean.  
 Cecilia, *Latin*, from Cecil.  
 Charity, *Greek*, love, bounty.  
 Charlotte, *French*, all noble.  
 Chloe, *Greek*, a green herb.  
 Christiana, *Greek*, belonging to Christ.  
 Cicely, *a corruption of Cecilia*, *q. v.*  
 Clara, *Latin*, clear or bright.  
 Clarissa, *Latin*, clear or bright.  
 Constance, *Latin*, constant.  
 Dagmar, *German*, joy of the Danes.  
 Deborah, *Hebrew*, a bee.  
 Diana, *Greek*, Jupiter's daughter.  
 Dorcas, *Greek*, a wild roe.  
 Dorothea or Dorothy, *Greek*, the gift of God.  
 Edith, *Saxon*, happiness.  
 Eleanor, *Saxon*, all fruitful.  
 Eliza, Elizabeth, *Hebrew*, the oath of God.  
 Ellen, *another form of Helen*, *q. v.*  
 Emily, *corrupted from Amelia*.  
 Emma, *German*, a nurse.  
 Esther, Hesther, *Hebrew*, secret.  
 Eudoia, *Greek*, prospering in the way.  
 Eudora, *Greek*, good gift.  
 Eudisia, *Greek*, good gift or well-given.  
 Eugenia, *French*, well-born.  
 Eunice, *Greek*, fair victory.  
 Eva or Eve, *Hebrew*, causing life.  
 Fanny, *diminutive of Francis*, *q. v.*  
 Fenella, *Greek*, bright to look on.  
 Flora, *Latin*, flowers.  
 Florence, *Latin*, blooming, flourishing.  
 Francis, *German*, free.  
 Gertrude, *German*, all truth.  
 Grace, *Latin*, favor.  
 Hagar, *Hebrew*, a stranger.  
 Hadassah, *Hebrew*, form of Esther, *q. v.*  
 Hannah, *Hebrew*, gracious.  
 Harriet, *German*, head of the house.  
 Helen or Helena, *Greek*, alluring.  
 Henrietta, *fem. and dim. of Henry*, *q. v.*  
 Hephzibah, *Hebrew*, my delight is in her.  
 Hilda, *German*, warrior maiden.  
 Honora, *Latin*, honorable.  
 Huldah, *Hebrew*, a weazel.  
 Isabella, *Spanish*, fair Eliza.  
 Jane or Jeanne, *fem. of John*, *q. v.*  
 Janet, Jeannette, little Jane.  
 Jemima, *Hebrew*, a dove.  
 Joan, *Hebrew*, *fem. of John*, *q. v.*  
 Joanna or Johanna, *form of Joan*, *q. v.*  
 Joyce, *French*, pleasant.  
 Judith, *Hebrew*, praising.  
 Julia, Juliana, *feminine of Julius*, *q. v.*  
 Katherine, *form of Catherine*, *q. v.*  
 Keturah, *Hebrew*, incense.  
 Keziah, *Hebrew*, cassia.  
 Laura, *Latin*, a laurel.  
 Lavinia, *Latin*, of Latium.  
 Letitia, *Latin*, joy of gladness.  
 Lilian, Lily, *Latin*, a lily.  
 Lois, *Greek*, better.  
 Louisa, *German*, *fem. of Louis*, *q. v.*  
 Lucretia, *Latin*, a chaste Roman lady.  
 Lucy, *Latin*, *feminine of Lucius*.  
 Lydia, *Greek*, descended from Lud.  
 Mabel, *Latin*, lovely or loveable.  
 Madeline, *form of Magdalen*, *q. v.*  
 Magdalen, *Syriac*, magnificent.  
 Margaret, *Greek*, a pearl.  
 Maria, Marie, *forms of Mary*, *q. v.*  
 Martha, *Hebrew*, bitterness.  
 Mary, *Hebrew*, bitter.  
 Matilda, *German*, a lady of honor.  
 Maud, *German*, *form of Matilda*, *q. v.*  
 May, *Latin*, month of May, or *dim. of Mary*, *q. v.*  
 Mercy, *English*, compassion.  
 Mildred, *Saxon*, speaking mild.  
 Minnie, *dim. of Margaret*, *q. v.*  
 Naomi, *Hebrew*, alluring.  
 Nest, *British*, the same as Agnes.  
 Nicholas, *Greek*, *feminine of Nicholas*.  
 Olive, Olivia, *Latin*, an olive.  
 Olympic, *Greek*, heavenly.  
 Ophelia, *Greek*, a serpent.  
 Parnell, or Petronilla, little Peter.  
 Patience, *Latin*, bearing patiently.  
 Paulina, *Latin*, *feminine of Paulinus*.  
 Penelope, *Greek*, a weaver.  
 Persis, *Greek*, destroying.  
 Philadelphia, *Greek*, brotherly love.  
 Philippa, *Greek*, *feminine of Philip*.  
 Phœbe, *Greek*, the light of life.  
 Phyllis, *Greek*, a green bough.  
 Polly, *variation of Molly*, *dim. of Mary*, *q. v.*  
 Priscilla, *Latin*, somewhat old.  
 Prudence, *Latin*, discretion.  
 Psyche, *Greek*, the soul.  
 Rachel, *Hebrew*, a lamb.  
 Rebecca, *Hebrew*, fat or plump.  
 Rhoda, *Greek*, a rose.  
 Rosa or Rose, *Latin*, a rose.  
 Rosalie or Rosaline, *Latin*, little rose.  
 Rosalind, *Latin*, beautiful as a rose.  
 Rosabella, *Italian*, a fair rose.  
 Rosamond, *Saxon*, rose of peace. [422

## NAMES AND THEIR MEANING.

Roxana, *Persian*, dawn of day.  
 Ruth, *Hebrew*, trembling, or beauty.  
 Sabina, *Latin*, sprung from the Sabines.  
 Salome, *Hebrew*, perfect.  
 Sapphira, *Greek*, like a sapphire stone.  
 Sarah, *Hebrew*, a princess.  
 Selina, *Greek*, the moon.  
 Sibylla, *Greek*, the counsel of God.  
 Sophia, *Greek*, wisdom.  
 Sophronia, *Greek*, of a sound mind.  
 Susan, Susanna, *Hebrew*, a lily.

Tabitha, *Syriac*, a roe.  
 Temperance, *Latin*, moderation.  
 Theodosia, *Greek*, given by God.  
 Tryphena, *Greek*, delicate.  
 Tryphosa, *Greek*, delicious.  
 Victoria, *Latin*, victory.  
 Vida, *Erse*, feminine of David.  
 Ursula, *Latin*, a she bear.  
 Walburga, *Saxon*, gracious.  
 Winifred, *Saxon*, winning peace.  
 Zenobia, *Greek*, the life of Jupiter.

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THERE—my blessing with thee!  
 And these few precepts in thy memory  
 See thou character: Give thy thoughts no tongue,  
 Nor any unproportioned thought his act.  
 Be thou familiar, but by no means vulgar.  
 Those friends thou hast, and their adoption tried,  
 Grapple them to thy soul with hoops of steel;  
 But do not dull thy palm with entertainment  
 Of each new-hatch'd, unfledged comrade. Beware  
 Of entrance to a quarrel, but, being in,  
 Bear 't that th' opposed may beware of thee.  
 Give every man thy ear, but few thy voice,  
 Take each man's censure, but reserve thy judgment.  
 Costly thy habit as thy purse can buy,  
 But not express'd in fancy; rich, not gaudy;  
 For the apparel oft proclaims the man. . . .  
 Neither a borrower nor a lender be;  
 For loan oft loses both itself and friend,  
 And borrowing dulls the edge of husbandry.  
 This above all: To thine own self be true,  
 And it must follow, as the night the day,  
 Thou canst not then be false to any man.—SHAKESPEARE.

**PROTECTING LEAD WATER PIPES.**—To protect lead water-pipes from the action of water, which often affects them chemically, partially dissolving them, and injuring the pipes, as well as poisoning the water, fill the pipes with a warm and concentrated solution of sulphide of potassium or sodium; leave the solution in contact with the lead for about fifteen minutes and then blow it out. This coats the inside of the pipes with sulphite of lead, which is absolutely insoluble, and cannot be acted upon by water at all.

**FIREPROOF WOOD.**—Soak 27.5 parts by weight of sulphate of zinc, 11 of potash; 22 of alum, and 11 of manganic oxide in luke warm water in an iron boiler, and gradually add 11 parts by weight of 60 per cent. sulphuric acid. The wood to be prepared is placed upon an iron grating in an apparatus of suitable size, the separate pieces being placed at least an inch apart. The liquid is then poured into the apparatus, and the wood allowed to remain completely covered for three hours, and is then air-dried.

**CEMENT FOR RUBBER BOOTS.**—A good cement for rubber boots is made by dissolving crude rubber in bisulphuret of carbon, making the solution rather thin. Put the cement upon the patch and the boot, heat both, and put them together.

**FURNITURE POLISH.**—For French polishing cabinet-makers use: Pale shellac, 1 pound; mastic, 1 2-5 ounces; alcohol of 90 per cent. standard, 1 to 1 1-5 pints. Dissolve cold, with frequent stirring.

## The Standard Silver Dollar.

The coinage of the standard silver dollar was first authorized by Act of April 2, 1792. Its weight was to be 416 grains standard silver; fineness, 892.4; which was equivalent to  $371\frac{1}{4}$  grains of fine silver, with  $44\frac{3}{4}$  grains of pure copper alloy. This weight was changed by act of January 18, 1837, to  $412\frac{1}{2}$  grains, and fineness changed to 900, thus preserving the same amount of pure silver as before. By act of February 12, 1873, the coinage was discontinued. The total number of silver dollars coined from 1792 to 1873 was 8,045,838. The act of 1873 provided for the coinage of the "trade dollar," of weight 420 grains, and an act passed in June, 1874, ordered that all silver coins should only be "legal tender at their nominal value for amounts not exceeding \$5." The effect of these acts was the "demonetization" of silver, of which so much has been said. Feb. 28, 1878, the coinage of the standard dollar of  $412\frac{1}{2}$  grains was revived by act of Congress; \$2,000,000 per month was ordered coined, and the coins were made legal tender for all debts, public and private. From February, 1878, to Nov. 1, 1885, 213,257,594 of these standard dollars were coined under the above act.

## Standard Time.

What is known as the "new standard time" was adopted by agreement by all the principal railroads of the United States at 12 o'clock, noon, on Nov. 18, 1883. The system divides the continent into five longitudinal belts, and fixes a meridian of time for each belt. These meridians are fifteen degrees of longitude, corresponding to one hour of time, apart. Eastern Maine, New Brunswick and Nova Scotia use the 60th meridian; the Canadas, New England, the Middle States, Virginia and the Carolinas use the 75th meridian, which is that of Philadelphia; the States of the Mississippi Valley, Alabama, Georgia and Florida, and westward, including Texas, Kansas, and the larger part of Nebraska and Dakota, use the 90th meridian, which is that of New Orleans. The Territories to the western border of Arizona and Montana go by the time of the 105th meridian, which is that of Denver; and the Pacific States employ the 120th meridian. The time divisions are known as intercolonial time, eastern time, central time, mountain time and Pacific time. A traveler passing from one time belt to another will find his watch an hour too fast or too slow, according to the direction in which he is going. All points in any time division using the time of the meridian must set their time-pieces faster or slower than the time indicated by the sun, according as their position is east or west of the line. This change of system reduced the time standards used by the railroads from fifty-three to five, a great convenience to the railroads and the traveling public. The suggestion leading to the adoption of this new system originated with Professor Abbe, of the Signal Bureau at Washington.

## **Theosophy.**

Much is said nowadays about theosophy, which is really but another name for mysticism. It is not a philosophy, for it will have nothing to do with philosophical methods: it might be called a religion, though it has never had a following large enough to make a very strong impression on the world's religious history. The name is from the Greek word *theosophia*—divine wisdom—and the object of theosophical study is professedly to understand the nature of divine things. It differs, however, from both philosophy and theology even when these have the same object of investigation. For, in seeking to learn the divine nature and attributes, philosophy employs the methods and principles of natural reasoning; theology uses these, adding to them certain principles derived from revelation. Theosophy, on the other hand, professes to exclude all reasoning processes as imperfect, and to derive its knowledge from direct communication with God himself. It does not, therefore, accept the truths of recorded revelation as immutable, but as subject to modification by later direct and personal revelations. The theosophical idea has had followers from the earliest times. Since the Christian era we may class among theosophists such sects as Neo-Platonists, the Hesychasts of the Greek Church, the Mystics of mediæval times, and, in later times, the disciples of Paracelsus, Thalhauser, Bohme, Swedenborg, and others. Recently a small sect has arisen, which has taken the name of Theosophists. Its leader was an English gentleman who had become fascinated with the doctrine of Buddhism. Taking a few of his followers to India, they have been prosecuting their studies there, certain individuals attracting considerable attention by a claim to miraculous powers. It need hardly be said that the revelations they have claimed to receive have been, thus far, without element of benefit to the human race.

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## **The Evolution Theory.**

The evolution or development theory declares the universe as it now exists to be the result of a long series of changes, which were so far related to each other as to form a series of growths analogous to the evolving of the parts of a growing organism. Herbert Spencer defines evolution as a progress from the homogeneous to the heterogeneous, from general to special, from the simple to the complex elements of life, and it is believed that this process can be traced in the formation of worlds in space, in the multiplication of types and species among animals and plants, in the origin and changes of languages and literature and the arts, and also in all the changes of human institutions and society. Asserting the general fact of progress in nature, the evolution theory shows that the method of this progress has been (1) by the multiplication of organs and functions; (2) by



## THE MIND CURE.

cording to a defined unity of plan, although with (3) the intervention of transitional forms, and (4) with modifications dependent upon surrounding conditions. Ancient writers occasionally seemed to have a glimmering knowledge of the fact of progress in nature, but as a theory "evolution" belongs to the enlightenment of the nineteenth century. Leibnitz, in the latter part of the seventeenth century, first uttered the opinion that the earth was once in a fluid condition, and Kant, about the middle of the eighteenth century, definitely propounded the nebular hypothesis, which was enlarged as a theory by the Herschels. The first writer to suggest the transmutation of species among animals was Buffon, about 1750, and other writers followed out the idea. The eccentric Lord Monboddo was the first to suggest the possible descent of man from the ape, about 1774. In 1813 Dr. W. C. Wells first proposed to apply the principle of natural selection to the natural history of man, and in 1822 Professor Herbert first asserted the probable transmutation of species of plants. In 1844 a book appeared called "Vestiges of Creation," which, though evidently not written by a scientific student, yet attracted great attention by its bold and ingenious theories. The authorship of this book was never revealed until after the death of Robert Chambers, a few years since, it became known that this publisher, whom no one would ever have suspected of holding such heterodox theories, had actually written it. But the two great apostles of the evolution theory were Charles Darwin and Herbert Spencer. The latter began his great work, the "First Principles of Philosophy," showing the application of evolution in the facts of life, in 1852. In 1859 appeared Darwin's "Origin of Species." The hypothesis of the latter was that different species originated in spontaneous variation, and the survival of the fittest through natural selection and the struggle for existence. This theory was further elaborated and applied by Spencer, Darwin, Huxley, and other writers in Europe and America, and though to-day by no means all the ideas upheld by these early advocates of the theory are still accepted, evolution as a principle is now acknowledged by nearly all scientists. It is taken to be an established fact in nature, a valid induction from man's knowledge of natural order.

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### The Mind Cure.

The mind cure, otherwise known in its various subdivisions as metaphysics, Christian science, mental science, etc., is a species of delusion quite popular at the present time. Every era of the world has cherished similar delusions, for the mass of the human race, even in what are considered the educated classes, are so unfamiliar with the processes of exact reasoning that they fall a

## THE MIND CURE.

ready prey to quacks of all kinds. The fundamental idea of the mind cure system is that there is no such thing as sickness. Disease, says one of their apostles, is an error of the mind, the result of fear. Fear is only faith inverted and perverted. God, who is all good Himself, and who made everything good, cannot have been the author of any disease. As disease, therefore, is not a creation, it has no existence, and when the healer has succeeded in impressing this fact upon the mind of the patient, the cure is effected. It is curious to note into what utter absurdities the need for consistency carries these apostles. Poisons, they say, would be quite harmless if the fear of them was removed, but we have yet to find the "mental science" teacher who will undertake to prove this by herself taking liberal doses of aconite and strychnine. The illnesses of children are explained by the hypothesis of hereditary fear. The majority of the teachers of this new faith are women, many of whom, no doubt, are sincere in their belief; but it may be safely stated that the men engaged as the so-called physicians of the new practice are, with few exceptions, unprincipled quacks, who have gone into the business for the money they can make by duping the ignorant. As far as there is any truth underlying the vagaries of mind cures, and their boasts of remarkable cases of healing, it may be admitted that the mind has much influence over the body. This fact has been recognized by intelligent physicians for centuries. And that the peculiar modern type of nervous diseases, which are so largely caused by excessive stimulus of the nerves and the imagination, should be amenable to cure through the imagination, is not strange. It will be noted that this mental cure has effected its miracles mainly among women, where it has the emotional temperament to work on, and almost wholly in the ranks of the wealthy and well-to-do, where there is little or no impoverishment of the system by insufficient food and excessive toil to hinder its effects. We have not heard, nor are we likely to hear, of an epidemic disease checked by the mind cure, or of the healing of acute affections or organic troubles through its agency. Nor do we hear of its seeking to carry its message of healing into the houses of the suffering poor in large cities, where hunger, exposure and foul airs open wide the door to fevers and all deadly diseases, nor yet into hospitals for contagious or incurable affections. In the presence of such realities it would prove, as its votaries probably understand, a too-painful mockery. Intelligently analyzed, therefore, this new revelation amounts to nothing more than a quite striking proof of the remarkable influence of the mind over the nervous system. Beyond this, the craze, in attempting to disprove the existence of disease, and to show that poisons do not kill, is simply running against the plain and inevitable facts of life, and can safely be left to perish through its own rashness.

## GEMS OF POETRY.

There is a tide in the affairs of men  
Which, taken at the flood, leads on to fortune;  
Omitted, all the voyage of their life  
Is bound in shallows and in miseries.—*Shakespeare.*

Therefore, since brevity is the soul of wit,  
And tediousness the limbs and outward flourishes—  
I will be brief.—*Shakespeare.*

The quality of mercy is not strain'd;  
It droppeth, as the gentle rain from heaven,  
Upon the place beneath.—*Shakespeare.*

What are monuments of bravery  
Where no public virtues bloom?  
What avail, in lands of slavery,  
Trophied temples, arch and tomb?—*Campbell.*

Virtue alone outbuilds the pyramids;      Not to him who rashly dares.  
Her monuments shall last when Egypt's      But to him who nobly bears,  
fall.—*Young.*      Is the victor's garland sure.—*Whittier.*

A trinity there seems of principles,  
Which represent and rule created life—  
The love of self, our fellows, and our God.—*Bailey.*

Hark, his hands the lyre explore!  
Bright-eyed Fancy, hovering o'er,  
Scatters from her pictur'd urn  
Thoughts that breathe and words that burn.—*Gray.*

I hold it truth with him who sings  
To one clear harp in divers tones,  
That men may rise on stepping-stones  
Of their dead selves to higher things.—*Tennyson.*

Think'st thou existence doth depend on time?  
It doth; but actions are our epochs.—*Byron.*

Man but dives in death;  
Dives from the sun in fairer day to rise.  
The grave his subterranean road to bliss.—*Young.*

There is no death! What seems so is transition;  
This life of mortal breath  
Is but a suburb of the life Elysian,  
Whose portal we call death.—*Longfellow.*

Know, then, thyself; presume not God to scan;  
The proper study of mankind is man.—*Pope.*

Lowliness is young ambition's ladder,  
Whereto the climber upward turns his face;  
But when he once attains the utmost round,  
He then unto the ladder turns his back,  
Looks in the clouds, scorning the base degrees  
By which he did ascend.—*Shakespeare.*

Condition, circumstance, is not the thing;  
Bliss is the same in subject or in king.—*Pope.*

## GEMS OF POETRY.

Men who their duties know,  
But know their rights, and, knowing,  
Dare maintain.—*Jones.*

Oh, fear not in a world like this,  
And thou shalt know ere long,  
Know how sublime a thing it is  
To suffer and be strong.—*Longfellow.*

The Arve and Arveiron at thy base  
Rave ceaselessly; but thou, most awful Form !  
Risest from forth thy silent sea of pines,  
How silently! Around thee and above  
Deep is the air, and dark, substantial black,  
An ebon mass; methinks thou piercest it  
As with a wedge.—*Coleridge* (On Mt. Blanc).

Let fate do her worst, there are moments of joy,  
Bright dreams of the past, which she cannot destroy;  
Which come in the night time of sorrow and care,  
And bring back the features that joy used to wear.—*Moore.*

Delightful task ! to rear the tender thought,  
To teach the young idea how to shoot,  
To pour the fresh instruction o'er the mind,  
To breathe th' enliv'ning spirit, and to fix  
The generous purpose in the glowing breast.—*Thomson.*

Every inordinate cup  
Is unblessed, and the ingredient is a devil —*Shakespeare.*

And I will trust that He who heeds  
The life that hides in mead and wold,  
Who hangs yon alder's crimson beads,  
And stains these mosses green and gold,  
Will still, as HE hath done, incline  
His gracious care to me and mine.—*Whittier.*

Yet I doubt not through the ages  
One increasing purpose runs,  
And the thoughts of men are widened  
With the process of the suns.—*Tennyson.*

Oh, that men should put an enemy in  
Their mouths to steal away their brains !—*Shakespeare.*

'Tis strange, but true, for truth is always strange,  
Stranger than fiction.—*Byron.*

Still to ourselves in every place consigned,  
Our own felicity we make or find.—*Goldsmith.*

Shall man alone, for whom all else revives,  
No resurrection know ?—*Young.*

To gild refined gold, to paint the lily,  
To throw a perfume on the violet,  
To smooth the ice or add another hue  
Unto the rainbow, or with taper light  
To seek the beauteous eye of heaven to garnish,  
Is wasteful and ridiculous excess.—*Shakespeare.*

The purest treasure mortal times afford  
Is spotless reputation; that away,  
Men are but gilded loam or painted clay.—*Shakespeare.*

## GEMS OF POETRY.

Our little lives are kept in equipoise  
By opposite attractions and desires;  
The struggle of the instinct that enjoys,  
And the more noble instinct that aspires.—*Longfellow.*

Oh! many a shaft at random sent  
Finds mark the archer little meant,  
And many a word at random spoken  
May soothe or wound a heart that's broken.—*Scott.*

A weapon that comes down as still  
As snowflakes fall upon the sod,  
But executes a freeman's will  
As lightning does the will of God;  
And from its force nor doors nor locks  
Can shield you; 'tis the ballot-box.—*Pierpont.*

Happy the man who sees a God employed  
In all the good and ill that checker life!—*Cowper.*

'Tis greatly wise to talk with our past hours,  
And ask them what report they bore to heaven.—*Young.*

Kind hearts are more than coronets,  
And simple faith than Norman blood.—*Tennyson.*

'Tis distance lends enchantment to the view,  
And clothes the mountain in its azure hue.—*Campbell.*

Good name, in man and woman, dear my lord,  
Is the immediate jewel of their souls.—*Shakespeare.*

Who, then, to frail mortality shall trust,  
But limns the water, or but writes in dust.—*Lord Bacon.*

My mind to me a kingdom is;  
Such present joys therein I find  
That it excels all other bliss  
That earth affords or grows by kind;  
Though much I want which most would have,  
Yet still my mind forbids to crave.—*Dyer.*

But words are things, and a small drop of ink,  
Falling, like dew, upon a thought, produces  
That which makes thousands, perhaps millions, think.  
—*Byron.*

His golden locks hath Time to silver turned,  
O time too swift! O swiftness never ceasing!  
His youth 'gainst time and age hath ever spurned,  
But spurned in vain; youth waneth by increasing.  
Beauty, strength, youth, are flowers but fading seen,  
Duty, faith, love, are roots, and ever green.—*Lord Bacon.*

Ill fares the land, to hastening ills a prey,  
When wealth accumulates and men decay;  
Princes and lords may flourish and may fade,  
A breath can make them as a breath has made,  
But an honest peasantry, a country's pride,  
When once destroyed, can never be supplied.—*Goldsmith.*

## GEMS OF POETRY.

An honest man's the noblest work of God.—*Pope*.

'Tis heaven alone that is given away;  
'Tis only God may be had for the asking.—*Lowell*.

There is no death! An angel form  
Walks o'er the earth with silent tread;  
He bears our best lov'd things away,  
And then we call them "dead."—*Harvey*.

First, then, a woman will or won't, depend on 't;  
If she will do 't, she will; and there's an end on 't.  
But if she won't, since safe and sound your trust is,  
Fear is affront, and jealousy injustice.—*Hill*.

What stronger breastplate than a heart untainted?  
Thrice is he arm'd that hath his quarrel just;  
And he but naked, though lock'd up in steel,  
Whose conscience with injustice is corrupted.—*Shakespeare*.

So dear to heaven is saintly chastity,  
That, when a soul is found sincerely so,  
A thousand liveried angels lackey her,  
Driving far off each thing of sin and guilt.—*Milton*.

Who has not felt how sadly sweet  
The dream of home, the dream of home,  
Steals o'er the heart, too soon to fleet,  
When far o'er sea or land we roam.—*Moore*.

No peace nor ease the heart can know  
Which, like the needle true,  
Turns at the touch of joy or woe,  
But, turning, trembles too.—*Mrs. Greville*.

Truth crushed to earth shall rise again;  
The eternal years of God are hers;  
But Error, wounded, writhes with pain,  
And dies among his worshippers.—*Byron*.

Rest here, distress by poverty no more;  
Here find that calm thou gav'st so oft before;  
Sleep, undisturb'd, within this peaceful shrine,  
'Till angels wake thee with a note like thine.—*Johnson*.

Care to our coffin adds a nail, no doubt,  
And every grin so merry draws one out.—*Walcot*.

Shall I, wasting in despair,  
Die because a woman's fair?  
Or make pale my cheeks with care  
'Cause another's rosy are?  
Be she fairer than the day,  
Or the flow'ry meads in May,  
If she be not so to me,  
What care I how fair she be?—*Wither*.

The world's a bubble, and the life of man,  
Less than a span.—*Bacon*.

Great wit is sure to madness close allied,  
And thin partitions do their bounds divide.—*Dryden*.

## GEMS OF POETRY.

What a piece of work is man ! How noble in reason ! how infinite in faculties ! in form and moving, how express and admirable ! in action, how like an angel ! in apprehension, how like a god !—*Shakespeare*.

She walks in beauty, like the night  
Of cloudless climes and starry skies ;  
And all that's best of dark and bright  
Meet in her aspect and her eyes ;  
Thus mellow'd to that tender light  
Which Heaven to gaudy day denies.—*Byron*.

If thou faint in the day of adversity, thy strength is small.—*Old Testament*.

In Faith and Hope the world will disagree,  
But all mankind's concern is Charity.—*Pope*.

Sweet are the uses of adversity,  
Which, like the toad, ugly and venomous,  
Wears yet a precious jewel in his head ;  
And thus our life, exempt from public haunt,  
Finds tongues in trees, books in the running brooks,  
Sermons in stones, and good in everything.—*Shakespeare*.

Should auld acquaintance be forgot,  
And never brought to min' ?  
Should auld acquaintance be forgot,  
And days o' auld lang syne ?—*Burns*.

Statesman, yet friend to truth ! Of soul sincere,  
In action faithful and in honor clear ;  
Who broke no promise, serv'd no private end ;  
Who gained no title, and who lost no friend.—*Pope*.

O woman, lovely woman ! nature made thee  
To temper man ; we had been brutes without you.  
Angels are painted fair, to look like you ;  
There's in you all that we believe in heaven :  
Amazing brightness, purity and truth,  
Eternal joy and everlasting love.—*Otway*.

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## MISQUOTATIONS.

It is a peculiar faculty of human memory to misquote proverbs and poetry, and almost invariably to place the credit where it does not belong.

Nine men out of ten think that "The Lord tempers the wind to the shorn lamb" is from the Bible, whereas Lawrence Sterne is the author. "Pouring oil upon the troubled waters" is also ascribed to the sacred volume, whereas it is not there ; in fact, no one knows its origin.

Again, we hear people say : "The proof of the pudding is in chewing the string." This is arrant nonsense, as the proverb says :

"The proof of the pudding is in the eating thereof, and not in chewing the string."  
Nothing is more common than to hear :

A man convinced against his will  
Is of the same opinion still.

This is an impossible condition of the mind, for no one can be convinced of an opinion and at the same time hold an opposite one. What Butler wrote was eminently sensible :

He that complies against his will  
Is of his own opinion still.

## POSTAL INFORMATION.

A famous passage of Scripture is often misquoted thus: "He that is without sin among you, let him cast the first stone." It should be: "Let him first cast a stone."

Sometimes we are told: "Behold how great a fire a little matter kindleth," whereas St James said: "Behold how great a matter a little fire kindleth," which is quite a different thing.

We also hear that a "miss is as good as a mile," which is not as sensible or forcible as the true proverb: "A miss of an inch is as good as a mile."

"Look before you leap" should be: "And look before you ere you leap."

Pope is generally credited with having written:

Immodest words admit of no defense,  
For want of decency is want of sense,

though it would puzzle any one to find the verses in his writings. They were written by the Earl of Roscommon, who died before Pope was born.

Franklin said: "Honesty is the best of policy," but the maxim is of Spanish origin, and may be found in "Don Quixote."

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## POSTAL INFORMATION.

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4  
 320 rods ab limbs  
 5 1/2 yds a Rod  
 160  
 1600  
 1760 yds a rods  
 3  
 5280 10 a mile

5280 ft to Cord along  
 from "Fourth Hill"

## The Newest Game

Takes the form of an information party, and is proving immensely popular. The game, as described by the *Boston Traveller*, is begun by passing to each gentleman a card and to the ladies small pieces of paper, which should be numbered. Those who discover the same number on their card and paper are partners for the game.

Each couple must think of a question, sensible or ridiculous, historical or in regard to the weather, to be written on the cards, after which the cards are to be gathered together, and the leader reads each in turn, giving a few moments for the partners to consider the subject and write the answer, which should be read aloud in turn. This is where the fun of the game begins, as many of the answers are exceedingly queer.

Those having a correct answer mark their card 10, a wrong answer 0, and if the answer is anywhere near right it is counted 5. When all are added, prizes may be distributed as in progressive games for the best and poorest record.

The instructive part of the game is the discussion which follows the questions. The height of Bunker Hill monument is what everybody living near it ought to know, and yet, at an information party held a few evenings ago, only one person in a company of twenty was sure of the exact number of feet.

---

### "The Earth is the Lord's."

Lord of the lambkin and the lion,  
Lord of Ben Lomond and Mount Zion,  
Of Israel and Italy,  
Watching in sweet tranquillity,  
I worship Thee!

Lord of the glow-worm and the planet,  
Lord of dim Patmos and grim Thanet,  
Of Jordan's flood and Highland Dee,  
Touched by their waves of harmony,  
I worship Thee!

Lord of the sunrise and the sundown,  
Lord of Jerusalem and London,  
Of ruined Babylon, Rome the free,  
Awed by sad tales of tragedy,  
I worship Thee!

Lord of the well-spring and the geyser,  
Lord of Jew Paul and Roman Cæsar,  
Of England and deep Germany,  
Dreaming of wondrous time to be,  
I worship Thee!

Lord of the lark—heaven's happy roamer,—  
Lord of King David and blind Homer,  
Of Scotland and green Galilee,  
Illumed by fires of memory,  
I worship Thee!

Lord of the dewdrop and the ocean,  
Lord of each heart's divine emotion,  
Of heaven-born science, piercing free  
To the sweet soul of mystery,  
I worship Thee!

Teach me, dear God, and make me lowly,  
Purge me with light, and make me holy;  
Let me be crucified, and be  
Christ-like, with Christ's humility,  
Adoring Thee!

—WM. FREELAND.

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